

REMARKS

Claims 232-321 were added in the response identified as Second Supplementary Response to the Office Action dated February 4, 2000. These added claims 232-321 correspond to claims under examination in the parent application serial no. 08/303,561 filed on 09/09/1994. The following chart shows how these added claims correspond to the claims of the parent application. Those added claims which correspond to claims allowed in the parent application should be allowed here for the same reason that the corresponding claims were allowed in the parent application.

Corresponding claim in parent	Added claim to the present application
24	232
25	233
26	234
86	235
87	236
88	237
89	238
90	239
96	240
97	241
98	242
99	243
100	244
101	245
102	246
103	247
104	248
105	249
106	250
107	251
108	252
109	253
110	254
111	255
112	256
113	257
Allowed 114	258
Allowed 115	259
Allowed 116	260
117	261
118	262
Allowed 119	263
Allowed 120	264
Allowed 121	265
122	266
123	267
Allowed 124	268
Allowed 125	269
Allowed 126	270
127	271
128	272
129	273
130	274

	131	275
Allowed	132	276
Allowed	133	277
	134	278
	135	279
Allowed	136	280
Allowed	137	281
Allowed	138	282
	139	283
	140	284
	141	285
	142	286
Allowed	143	287
Allowed	144	288
	145	289
Allowed	146	290
	147	291
Allowed	148	292
	149	293
	150	294
	151	295
Allowed	152	296
Allowed	153	297
Allowed	154	298
Allowed	155	299
Allowed	156	300
Allowed	157	301
	158	302
	159	303
Allowed	160	304
Allowed	161	305
Allowed	162	306
Allowed	163	307
	164	308
	165	309
	166	310
Allowed	167	311
Allowed	168	312
	169	313
	170	314
Allowed	171	315
Allowed	172	316
Allowed	173	317
	174	318

175	319
176	320
177	321

PRELIMINARY COMMENTS

The present application is a divisional application of copending US Application Serial No. 08/303,561 filed 09/09/1994 which is a continuation of US Application Serial No. 08/060,470 filed on 05/11/1993 which is a continuation of US Application Serial No. 07/875,003 filed on 04/24/1992 which is a divisional application of US Application Serial No. 07/053,307 filed on 05/22/1987. The prosecution of all ancestral applications are incorporated herein by reference. In a subsequent paper, the Sixth Supplemental Amendment, selected papers from the ancestral file are submitted as Exhibit.

The entire file history of all the ancestral applications of the present application will be submitted as part of a subsequent paper in this application. Thus all papers not entered in the parent application will be presented for entry in the present application.

In the parent application:

1. Claims 24-26, 86-90, 96-113, 117-118, 122-123, 127-131, 134, 135, 139-142, 145, 147, 149-151, 158, 159, 164-166, 169, 170 and 174-177 were asserted by the Examiner not to be supported by the priority document. The corresponding claims of the present application are 232-257, 261, 262, 266, 267, 271-275, 278, 279, 283-286, 289, 291, 293-295, 302, 303, 308-310, 313, 314 and 318-321.
2. Claims 24-26, 86-90, 96-113, 117-118, 122, 123, 127-131, 134, 135, 139-141, 145, 147, 149-151, 158, 159, 164-166, 169, 170 and 174-177 of the parent application were rejected as anticipated under 35 USC 102(a) by the Asahi Shinbum article. The corresponding claims of the present application are 232-257, 261, 262, 266,

267, 271-275, 278, 279, 283-286, 289, 291, 293-295, 302, 303, 308-310, 313, 314 and 318-321.

3. Claims 24-26, 86-90, 113, 117-118, 122, 123, 127-131, 134, 135, 139-141, 145, 147, 149-151, 158, 159, 164-166, 169, 170 and 174-177 of the parent application were rejected as obvious under 35 USC 103(a) in view of the Asahi Shinbum article. The corresponding claims of the present application are 232-257, 261, 262, 266, 267, 271-275, 278, 279, 283-286, 289, 291, 293-295, 302, 303, 308-310, 313, 314 and 318-321.
4. Claims 24-26, 86-90, 96-113, 129-131, 134, 135, 139-142, 145, 147, 149-151, 158, 159, 164-166, 169, 170, and 174-177 of the parent application were rejected as not enabled under 35 USC 112, first paragraph. The corresponding claims of the present application are 232-257, 273-275, 278, 279, 283-286, 289, 291, 293-295, 302, 303, 308-310, 314, 315 and 318-321.
5. Claims 86-87, 96-108, 118, 122, 123, 129-131, 134, 135, 139-142, 164-166 and 169-177 of the parent application were rejected as indefinite under 35 USC 112, second paragraph. The corresponding claims of the present application are 236, 237, 240-252, 262, 266, 267, 273-275, 278, 279, 283-286, 308-310, 313, 314 and 318-321.

Applicants assume that the corresponding claims added to the present application will be rejected for the same reasons as given in the final rejection of the parent application. Arguments presented in this paper as relevant to added claims are applicable to other claims rejected for the same reasons and to other objections to the specification for the same reasons.

ARGUMENT

Priority

The arguments herein are in response to the objections and rejections of the claims in the parent application. Thus, reference will be made to the final rejection of the parent application. In this response, papers referred to are found in Attachments 1 to 57.

These are referred to in the text in brackets such as [Attachment 2] for Attachment 2.

Since the Examiner's comments referred to are directed to the claims of the parent, the arguments state the parent claim number. The table above gives the corresponding claims of the present application.

In addition to Applicants' previously presented arguments in support of their claim of priority, Applicants add these comments which specifically rebut the comments of the Examiner against their claim of priority in the final rejection dated 08/27/1997 of the parent application 08/303,561. The Examiner has acknowledged applicant's claim for priority under 35 USC §119 in the parent application, Serial No. 08/053,307 filed April 23, 1993. The certified copy has been filed in parent application, Serial No. 08/053,307, filed on April 23, 1993 as paper no. 28. (References to the priority document herein are to the corresponding European Patent Application 275 343 A1 published on July 27, 1988.) [Attachment 1]

Applicants respectfully disagree with the Examiner that support is not found in that certified copy for the invention as presently claimed.

In this regard the Examiner states in the final rejection of the parent application:

Applicants' arguments filed April 11, 1996 [Attachment 2], January 3, 1996 and September 29, 1996, paper numbers 53, 50 and 51, as well as the Affidavits filed September 29, 1995 and January 3, 1996, paper numbers 49 and 52, have been fully considered but they are not deemed to be persuasive. The Applicants quote some passages out of the priority document and argue that the present claims are fully based on that document. Nevertheless, that priority document is not deemed to provide basis for the limitations found in the present claims.

In this passage the Examiner states that "Applicants' arguments ... are not **deemed** to be persuasive" and "[n]evertheless, that priority document is not **deemed** to provide basis for the limitations found in the present claims." Webster's Ninth New Collegiate Dictionary (Merriam-Webster Inc., Springfield, Mass. 1987) defines "deem" as a transitive verb meaning "to come to think or judge" and as an intransitive verb meaning "to have an opinion : believe." The examiner has used the intransitive form of the verb "deemed". The examiner has cited no statutory or case law authority which permits an examiner to object to a claim of priority based on the examiners "opinion" or "belief" that a priority document does not support applicant's claims. The Examiner must support a denial of a claim of priority based on what is actually stated in the priority document.

The Examiner further states in support of the Examiner's "opinion" or "belief" at page 3, paragraph 4.b of the final rejection in the parent application:

- i. The recitation of a "composition including a transition metal, a rare earth or rare earth-like element, an alkaline earth element, and oxygen", as found in claim 86 (lines 2-4). The certified priority document may provide basis for the formula $RE_2TM.O_4$ at p. 2, para. 4, but the claimed composition is deemed to be much broader than that formula.

Applicants respectfully disagree. In the priority document, for example in the abstract, RE is a rare earth element, TM is a transition metal and O is oxygen. The priority document [Attachment 1] further states at Col. 2, lines 22-25 "the lanthanum which belongs to the IIB group of elements is in part substituted by one member of the neighboring IIA group of elements...". Group IIA elements are the alkaline earth elements. The present specification teaches at page 11, lines 22-23, that RE stands for the rare earths (lanthanides) or rare earth-like elements. The "rare earth like element" acts like a rare earth element in the superconductive composition. Thus a rare earth-like element is an equivalent of rare earth element. Similar language appears in the present specification at page 12 lines 6--8, "the lanthanum which belongs to the IIB group of elements is in part substituted by one member of the neighboring IIA group of elements...". Therefore, the priority document teaches a "composition including a transition metal, a rare earth or rare earth-like element, and alkaline earth. Applicants note that in the passage quoted above, the Examiner incorrectly states that Applicants claim a composition. This is not correct. Applicants claim an apparatus for flowing a superconducting current in a composition, such as a

transition metal oxide. (This characterization is exemplary only and not intended to limit the scope of any claims.) In the last sentence of the passage quoted above the Examiner incorrectly states "the claimed composition is **deemed** to be much broader than [the] formula" $\text{RE}_2\text{TM.O}_4$ ". The priority document is not limited to his formula. The composition taught by the priority document have variable amounts of oxygen, rare earth, rare earth-like and alkaline earth elements as is clearly shown in the abstract of the priority document.

The Examiner further states in the final rejection of the parent application:

- ii. The limitation "non-stoichiometric amount of oxygen", as found in claim 6 and 86 (line 6). Basis may be seen for an oxygen deficit at p. 2, para. 4, but no such basis is seen for the more general limitation of "a nonstoichiometric amount of oxygen".

Applicants respectfully disagree. At Col. 3, lines 46-50 the priority document refers to Applicants publication in Z. Phys. B - Condensed Matter 64 (1986) 189-193 [Attachment 3] which is incorporated by reference in the present specification at page 6, lines 7-10. (This article is referred to here in as Applicants' article.) This article states at page 190, left col., lines 13-14 "[t]his system exhibits a number of oxygen-deficient phases with mixed-valent copper constituents." The priority document has various general formulas such as at Col. 3, lines 40, " $\text{La}_{2-x}\text{Ba}_x\text{CuO}_{4-y}$ $x < 1$ and $y \geq 0$." The abstract has a more generic formula. A stoichiometric compound has a fixed amount of each element that make up the compound. Since, the amount of oxygen is variable,

the formula has nonstoichiometric amounts of oxygen. Therefore, the priority document teaches nonstoichiometric amounts of oxygen.

In Attachment 39 of this response, there are copies of pages 245 and 225 of Inorganic Chemistry by Moeler, John Wiley & Sons, Inc. 1952 and a copy of page 70 of Fundamentals of Chemistry, A Modern Introduction by Brescia et al. , Academic Press, 1966. Attachment 39 provides an explanation of the terms stoichiometric and nonstoichiometric. The documents in Attachment 39 support Applicants' position that the priority document teaches nonstoichiometric amounts of oxygen.

Moeler states at page 224:

NON-STOICHIOMETRIC COMPOUNDS

The law of definite proportions is one of the basic tenets of chemistry. Its validity is indicated by the restrictions imposed upon bond formation where electrons are involved as already outlined, and its application is generally the assumed basis for any type of chemical combination. There are, however, many instances of apparent departure from this rule among solid compounds. Such compounds do not possess the exact compositions which are predicted from electronic considerations alone and are commonly referred to as Berthollide or non-stoichimetric. (Emphasis Added)

The Examiner further states in the final action of the parent application:

iii. The limitation "a composition exhibiting a superconductive state" is found in present claim 88, (line 2). Wherein the certified priority document may provide basis for compositions of the formula $RE_2TM.O_4$, as discussed above, but "transition metal oxide" and "superconductive state" are deemed to be much broader than the formula $RE_2TM.O_4$.

Applicants respectfully disagree. The field of the invention of the priority document [Attachment 1] is "a new class of superconductors in particular components ..." and the title is "New Superconductive Compounds ...". Applicants' article [Attachment 3] which is referred to in the priority document states at page 190, left Col., lines 14-16 from the bottom "X-ray powder diffractograms ... revealed three individual crystallographic phases." In the conclusion at page 192 the article states "[t]he system consists of three phases, one of them having a metallic perovskite-type layer-like structure. The characterization of the new, apparently superconducting, phase is in progress." Thus the priority document supports the limitation "a composition exhibiting a superconductive state". The general formula $RE_{2-x}AE_xTM.O_{4-y}$ $x < 0.3$ $0.1 \leq y \leq 0.5$ and the more specific formula $RE_2TM.O_4$ of the priority document is a composition; is a metal oxide; and is a transition metal oxide as recited in claims 24, 89 and 90 of the parent and in corresponding added claims 232, 238 and 239 herein. As noted above, the Examiner incorrectly implies that the priority document is limited to compounds having the formula $RE_2TM.O_4$.

The Examiner further states in the final rejection of the parent application:

iv. The limitation "a copper-oxide compound" is recited in claim 96 (line 6). The certified priority document may provide basis for compositions of the formula $RE_2TM.O_4$, as discussed above, but "a copper-oxide compound" is not deemed to be equivalent to a composition of the formula $RE_2TM.O_4$. Basis is not seen in the certified priority document for "a copper oxide compound" with the breadth of the present claims.

Applicants respectfully disagree. Initially the Examiner incorrectly implies claim 96 of the parent application corresponding claim 240 herein, is directed to a copper oxide compound. This claim is directed to a "copper oxide composition consisting essentially of a copper oxide compound having a layer-type perovskite-like structure." The priority document [Attachment 1] recites numerous copper oxide compositions. It is noted that the Abstract of the priority document refers to "[t]he superconductive compounds are oxides of the general formula $RE_{2-x}AE_xTM.O_{4-y}$, wherein RE is a rare earth, AE is a member of the group of alkaline earths or a combination of at least two members of that group, and TM is a transition metal, and wherein $x < 0.3$ and $0.1 \leq y \leq 0.5$." This formula permits no alkaline earth and a varying amount of alkaline earth, rare earths and a varying amount of oxygen. At column 3, lines 20 and 35, there is recited "the Ba-La-Cu-O system" and at line 41 " $La_{2-x}Ba_xCuO_{4-y}$ $x < 1$ and $y \leq 0$ " and at line 44 teaches $La_{1-x}Va_xCuO_{3-y}$. Thus the priority document provides support for a composition including a transition metal, a rare earth or rare earth-like elements, an alkaline earth element, an oxygen as found in Applicants' claim, specifically claim 86 of the parent application, corresponding claim 235 herein. It is noted that at column 2, lines 13-19

the priority document states that "it is a characteristic of the present invention that in the compounds in question that the RE portion is partially substituted by one member of the alkaline earth group of metals, or by a combination of the members of this alkaline earth group and that the oxygen content is at a deficit." It is further noted that at column 2, lines 20-23 it states that "for example, one such compound that meets the description given by this lanthanum copper oxide La_2CuO_4 in which the lanthanum which belongs to the IIIB group of the elements is in part substituted by one member of the neighboring IIIA group of elements."

The priority document [Attachment 1] at column 3, line 6 recites Ti as a transition metal. It is noted that in claim 1 of the priority document, claim 1 recites the structure $\text{RE}_{2-x}\text{AE}_x\text{TM.O}_{4-y}$ wherein TM is a transition metal. Claim 2 therein recites copper as the transition metal. Claim 3 therein recites nickel as the transition metal. Claim 8 therein recites chromium as the transition metal. Consequently, a broader class of transition metals other than copper is supported by the priority document.

It is clear from the quoted sections of the priority document that the priority document clearly supports a much broader composition than the Examiner is claiming that it does, and that the priority document, in fact, does support applicant's claims.

As noted above, the general formula of the priority document is much broader than the formula $\text{RE}_2\text{TM.O}_4$ which the Examiner incorrectly states the priority document is limited to. The quantity of oxygen, the rare earth element and of an alkaline element is

variable and the transition metal is not limited to copper. Consequently, the term "a copper-oxide compound" is adequately supported by the priority document.

The Examiner further states in the final rejection of the parent application:

v. The limitation to the effect that "the copper oxide compound includes (including) at least one rare-earth or rare-earth-like element and at least one alkaline-earth element", as recited in claim 103 (lines 6 and 8). The certified priority document may provide basis for compositions of the formula $RE_2TM.O_4$, as discussed above, but basis is not seen for the more general limitation of "a copper-oxide compound" with a rare-earth (like) element and an alkaline earth element.

Applicants respectfully disagree. The second line of the abstract gives the general formula " $RE_{2-x}AE_xTM.O_{4-y}$ $x < 0.3$ and $0.1 \leq y \leq 0.5$." In claim 1 of the priority document $y \leq 0.5$. Claim 2 recites RE is lanthanum and TM is a copper. Claim 3 recites RE is cerium and TM is nickel. Claim 4 recites RE is lanthanum and TM is nickel. Claim 8 recites RE is lanthanum and TM is chromium. Claim 9 recites RE is neodymium and TM is copper. Applicants' claim 103 of the parent application and corresponding claim 247 herein recites "the copper-oxide compound including at least one rare-earth or rare-earth-like element and at least one alkaline-earth element". The priority document clearly supports this recitation. Applicants, as stated above, respectfully submit the Examiner is misrepresenting the priority document [Attachment 1] which refers throughout and, in particular, in the Abstract to "the general formula $RE_{2-x}AE_xEM.O_{4-y}$ as stated above which includes a copper-oxide as stated above. The Examiner further

states in the passage quoted above "but basis is not seen for the more general limitation of 'a copper-oxide compound' with a rare-earth (like) element and in alkaline earth element." It is noted that in the priority document, claim 2 refers to lanthanum as the rare earth; claim 3 refers to cerium as the rare earth; claim 5 refers to barium as a partial substitute for the rare earth; claim 6 refers to calcium as a partial substitute for the rare earth; claim 7 refers to strontium as a partial substitute for the rare earth and claim 9 refers to neodymium as the rare earth. Clearly, the priority document uses barium, calcium and strontium. Consequently, the priority document supports the term rare earth-like since it includes elements (e.g. barium, calcium and strontium) other than those commonly referred to as the rare earth elements [which are elements 57-71] which satisfy the teaching of the priority document and of the present application. The Abstract of the priority document refers to "AE as a member of the alkaline earth or a combination of at least two members of that group". Consequently, the priority document clearly supports an alkaline earth element.

The Examiner further states in the final rejection of the present application:

vi. The limitation to the effect that "the copper-oxide compound includes at least one element (oxygen) in a nonstoichiometric atomic proportion", as found in claim 101 (lines 2 and 3), 102 (lines 2 and 3), 107 (lines 2 and 3), and 108 (lines 2 and 3). Basis may be seen for an oxygen deficit as discussed above, but no such basis is seen for the more general limitation of "a nonstoichiometric atomic proportion".

Applicants disagree for the same reasons given above for why the priority document supports "nonstoichiometric amount of oxygen".

The Examiner further states in the final rejection of the present application:

vi. The limitation as to "the effectively-zero-bulk-resistivity intercept temperature $T_{\rho=0}$, as found in claim 103 (lines 13, 6 and 17). The critical temperature, T_c , is discussed throughout that certified priority document, but not $T_{\rho=0}$.

Applicants respectfully disagree. $T_{\rho=0}$ is the temperature at which the bulk resistivity is about zero. T_c is the critical temperature or the temperature above which superconductivity does not exist. The priority document [Attachment 1] refers to Applicants' article [Attachment 3] of which Figures 1,2 and 3 are the same figures as Figures 2, 3 and 4 of the present application. At page 22, lines 19-24, the present specification refers to Figure 4 of the specification stating "[i]ts resistivity decreases by at least three orders of magnitude, giving evidence for the bulk being superconducting below 13 K with an onset around 35 K, as shown in FIG. 4 on an expanded scale." When a superconductor is totally superconductive the resistivity, ρ , is zero. The temperature at which this occurs is $T_{\rho=0}$. Applicants' article, [Attachment 3] (and thus the priority document [Attachment 1]), at page 191, right column, in referring to Fig. 1 thereof states "[u]pon cooling from room temperature, the latter exhibit a nearly linear metallic decrease of $\rho(T)$, then a logarithmic type of increase, before undergoing the transition to superconductivity." And in the sentence bridging pages 191-192

"[t]herefore, under the above premises, the peak in $\rho(T)$ at 35 K, observed ... has to be identified as the start to superconductive cooperative phenomena." And Applicants' article at page 192, left column, states "[u]pon cooling below T_c ... the bulk resistivity gradually drops to zero by three orders of magnitude, for sample 2(Fig. 1)" From these statements in Applicants article (which is referred to in the priority document) it is clear that the language objected to by the examiner is supported in the priority document.

In response to Applicants' arguments filed March 7, 1997 [Attachment 4] (#59) of the ancestral applications the Examiner states "they have been fully considered but not found to be persuasive".

The Examiner states in the final rejection of the parent application:

i. The Applicants quote portions out of the priority document and assert that those quoted sections "clearly (support) a much broader composition than the Examiner is claiming it does, and that the priority document, in fact, does support applicant's (sic) claim 86." The fact remains, nevertheless, that the priority document refers to the general formula $RE_2TM.O_4$ in which the rare earth element (RE) may be partially substituted with a Group IIA metal. That disclosure in the priority document does not provide support for the broader limitations of the present claims, which do not limit the invention to that general formula.

As stated above the Examiner incorrectly states that the priority document is limited to formula $RE_2TM.O_4$. This is clearly incorrect.

The Examiner further states in the final rejection of the parent application:

ii. The Applicants argue that the disclosure of varying amounts of oxygen in the priority document provides support for earlier priority for the term "non-stoichiometric amount of oxygen". Again, however, that disclosure in the priority document does not provide support for the broader limitations of the present claims, which do not limit the invention to those varying amounts.

It is not clear what the Examiner is trying to say in the last sentence of this quoted passage. The general formula in the Abstract of the priority document [Attachment 1], $RE_{2-x}AE_xTM.O_{4-y}$, has the atomic amount of O varying from 0 to 4 independent of the atomic amount of RE, AE and TM. Thus the amount of O must have non-stoichiometric values. The Examiner's comments in the passage above are clearly in error.

The Examiner further states in the final rejection of the present application:

iii. The Applicants urge that the disclosure in the priority document of the formula $RE_2TM.O_4$ provides support for their limitations of "transition metal", "copper-oxide compounds", "rare earth or rare earth-like elements", and "alkaline earth element". Again, however, that disclosure in the priority document does not provide support for the broader limitations of the present claims, which do not limit the invention to that formula.

The Examiner again incorrectly states that the priority document is limited to the formula $RE_2TM.O_4$. As stated above the examiner is clearly in error. The priority document supports a much broader formula than $RE_2TM.O_4$. As shown above, the priority document clearly supports Applicants' claim limitations "transition metal", "copper-oxide compounds", "rare earth or rare earth-like elements" and "alkaline earth elements".

The Examiner further states in the final rejection of the present application:

iv. The Applicants further "assume that the Examiner agrees with applicant's (sic) statements in their prior response in that the concept of the intercept temperature is well known in the prior art and can be included in claim 103." No basis is seen for that assumption. As noted in the previous Office Action and repeated above, the term " $T_{\rho=0}$ " is not found in the priority document. Well known or not, there is no basis for that term in the priority document.

For the reason given above the priority document clearly supports the term " $T_{\rho=0}$ ".

Although this particular symbol is not used in the priority document, the priority document clearly shows that as temperature is decreased the resistivity of a superconductor begins to drop in the value at the critical temperature T_c and goes to zero at another temperature, that is $T_{\rho=0}$. This symbol is just a well known short hand notation for that temperature. This property of superconducting materials is well known prior to Applicants filing date, in fact that is what is meant by the term superconductor which is a material for which $\rho=0$ for temperatures less than a certain temperature, i.e.,

$T_{\rho=0}$. It is also well-known that: "[i]n the ideal case the resistance vanishes completely and discontinuously at a transition temperature. T_s ... Actually, the resistance temperature curve does fall more sharply the more specimen is like a single crystal ... [T]he drop always occurs in a measurable temperature range ..." (Theory of Superconductivity, M. von Laue, Academic Press, Inc., 1952) (See Appendix C of Applicants' response dated September 25, 1995) [Attachment 5]. Moreover, the priority document at column 1, the first sentence of the Background of the Invention states "[s]uperconductivity is usually defined as the complete loss of electrical resistance of a material at a well defined temperature". That temperature is symbolically represented as $T_{\rho=0}$.

CLAIM REJECTIONS - 35 USC § 102

Prior to the Examiner's Answer in the parent application, claims 24-26, 86-90, 96-135, and 137-177 were rejected under 35 U.S.C. § 102(a) as being anticipated by Asahi Shinbum, International Satellite Edition (London), November 28, 1986 (hereinafter, "the Asahi Shinbum article"). These claims correspond to claims 232-234, 235, 279 and 281-321 herein.

The Examiner is stating that everything within Applicants non-allowed claims is found in the Asahi Shinbum article. All of Applicants' non-allowed claims are dominant to (or generic to) the one allowed claim, claim 136 of the parent application, claim 280 herein. Thus by stating that all the non-allowed claims are anticipated, the Examiner is stating that the portion of each non-allowed claim which does not overlap the allowed claim is taught in the Asahi Shinbum article. This means that a person of skill in the art needs nothing more than what is taught in the Asahi Shinbum article to practice that part of each of Applicants non-allowed claims which does not overlap Applicants' allowed claim.

The only parts of the Asahi Shinbum article [Attachment 6] which are relevant to Applicants claim are in the first paragraph:

A new ceramic with a very high T_c of 30K of the superconducting transition has been found. The possibility of high T_c - superconductivity has been reported by scientists in Switzerland this spring. The group of Prof. Shoji

TANAKA, Dept. Appl. Phys. Faculty of Engineering at the University of Tokyo confirmed in November, that this is true.

in the second paragraph:

The ceramic newly discovered, is an oxide compound of La and Cu with Barium which has a structure of the so-called perovskite and shows metal-like properties. Prof. Tanaka's laboratory confirmed that this material shows diamagnetism (Meisner effect) which is the most important indication of the existence of superconductivity.

The Swiss scientist are the inventors of the present application. Thus this clearly refers to Applicants work which was reported in Applicants article. These passages say that Prof. Tanaka confirmed Applicants work. The newly discovered ceramic referred to in the article is the ceramic reported on in Applicants' article. The present applicant was filed less than one year after the publication of Applicants' article. This article is a disclosure of Applicants' own invention and cannot be used as a reference against the present application.

Since the present application was filed within one year of Applicants' article, Applicants' article is not a reference as to them. Thus the only portion of the Asahi Shinbum article [Attachment 6] relevant to Applicants' claims is:

A new ceramic with a very high T_c of 30K of the superconducting transition ... is an oxide compound of La and Cu with Barium which has a structure of the so-called perovskite and shows metal-like properties.

Since the Asahi Shinbum article [Attachment 6] refers to " T_c of 30K" and since each of Applicants claims recites $T_c \geq 26^\circ\text{K}$, the Asahi Shinbum article alone cannot anticipate $T_c \geq 26^\circ\text{K}$ since to be an anticipation a reference must contain all the limitations of the claim it is said to anticipate. Also, the Asahi Shinbum article [Attachment 6] provides no teaching of how to make the "new ceramic". A reference which does not provide a method of making a composition cannot anticipate a claim to the composition and thus to a use of that new composition. Also, the Asahi Shinbum article [Attachment 6] has no specific embodiment of the new composition. Thus it cannot anticipate under 35 USC 102.

Applicants' Article Was in the US in Ready To File Form

The issue involved here is straight forward. A third party reproduced and reported that fact in a written publication before of Applicants' filing date. The work of Applicants was reported in a written description published before the publication of the third party. Applicants filed the present application within one year of their publication, but after the third party publication. If Applicants did not file the present application within one year of the date of Applicants' article, Applicants' article would be a valid reference under 35 USC 102(a). But since Applicants filed the present application within 1 year of Applicants' article, it is not a reference under 35 USC 102(b).

35 USC 100 states the term "invention" means invention or discovery.

35 USC 102(a) states "[a] person shall be entitled to a patent unless ... the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the Applicants for patent."

Applicants invention or discovery was on or before April 17, 1986 which is the date Applicants submitted Applicants' article to Z.Phys.B. [Attachment 3] That article was published in September, 1986. Therefore, Applicants invented their invention prior to the date of the Asahi Shinbum article, November 28, 1986. Evidence submitted proving that Applicants conception was in the United States at Applicants direction prior to Nov. 28, 1986 is discussed below. In addition, the following evidence shows that Applicants' article was in this country in possession of IBM, the assignee, prior to the date of the Asahi Shinbum article. Attachment K of Applicants' response dated December 27, 1998, [Attachment 7] page 1, is a copy of the front cover of Zeitschrift Fur Physik B Condensed Matter Vol. 64 which contains Applicants' article [Attachment 3] (pp 189-193) which is referred to and incorporated by reference at page 6, lines 6-10, of Applicant's specification. Applicants state at page 6 of the specification that Applicants' article is "[t]he basis of our invention". This page bears in the upper right the date stamp of the IBM Research Library bearing the date of Sept. 18, 1986. Page 2 of Attachment K [Attachment 7] of Applicants' response dated December 27, 1998, is an enlarged view of the upper right corner showing the date stamp. Thus the assignee

of the present invention, IBM, who was the employer of the inventors at the time of the conception of the invention, had in its possession in the United States, prior to the date of the Asahi Shinbum [Attachment 6], a copy of the article which Applicants state forms the basis of their invention. Thus IBM had in its possession in the United States a written description of Applicants' invention in "ready to patent form" (as defined by the United States Supreme Court in Pfaff v. Wells 48 USPQ 2d 1641 decided November 10, 1998) prior to the date of the Asahi Shinbum article. The US Supreme Court held that "reduction to practice" is not needed to establish a date for invention. The court stated " [t]he statute's only specific reference to that term is found in §102(g), which sets forth the standard for resolving priority between two competing claimants to a patent." Since §102(g) is not applicable here, "diligence" and "reduction to practice" are not required. Applicants article in Zeitschrift Fur Physik [Attachment 3] "is proof that prior to [the date of the Asahi Shinbum article Applicants have] prepared drawings or other descriptions of the invention that were sufficiently specific to enable a person skilled in the art to practice the invention." The Asahi Shinbum article states that Applicants' work was reproduced, by others, thus Applicants article was sufficiently specific for a person of skill in the art to practice Applicants' invention. Also, as stated in Applicants' response dated December 18, 1998 [Attachment 8], more than 5,200 articles refer to Applicants' article showing that Applicants enabled the field of high T_c superconductivity. Thus the Asahi Shinbum article is not a valid §102(a) reference against Applicants' claimed invention.

The Examiner states in the final rejection of the parent application:

ii. The Applicants assert that the Asahi Shinbum article reports a third party's confirmation of their original discovery. That assertion appears to be correct, but the article still is deemed to be prior art under 35 USC 102(a).

(1) It should be noted again, however, that the Applicants' discovery was not originally made in this country- and that they cannot show an earlier date than December 1986 for their invention in this country. The Asahi Shinbum article was published on November 28, 1986.

Applicants disagree with the Examiner. Applicants note that the Examiner acknowledges that the Asahi Shinbum article "confirms [Applicants'] original discovery." 35 USC 102(a) does not require Applicants to show a date of invention in this country prior to the Asahi Shinbum article [Attachment 6] to avoid the Asahi Shinbum article being prior art. 35 USC 102(a) states "A person shall be entitled to a patent unless ... the invention was ... described in a printed publication in this or a foreign country, before the invention thereof by the application for patent." 35 USC 100 does not include reduction to practice in this country or conception in this country as part of the definition of invention. Only 35 USC 102(g) includes the language "reduction to practice" and "invention in this country". If Congress intended a reduction to practice to be necessary for a patent applicant to show that they invented their invention before the date of the printed publication, Congress would have included such language in the 35 USC 102(a). Also, if Congress intended that invention in this country was to be necessary for a patent applicant to show that they invented their invention before the

date of the printed publication, Congress would have included such language in 35 USC 102(a).

In the final rejection of the parent application the Examiner states:

- a. As discussed in paper no. 20 of the ancestral application, 07/053,307, it is not fully clear to what exact date Applicants are entitled. Based on the record, nonetheless, that date would appear to be no later than around December 13, 1986, the date samples were tested in the US to show superconductivity. See MPEP 715 et seq. The Asahi Shinbun article was published on November 28, 1986.
- b. The reference confirms superconductivity in an oxide compound of La and Cu with Ba having a structure of the so-called perovskite structure. Although the reference fails to teach use of the testing of zero resistance for confirming superconductivity, it inherently must have been used because it is one of two methods used for testing for superconductivity (the other being diamagnetism). Accordingly, the burden of proof is upon the Applicants to show that the instantly claimed subject matter is different from and unobvious over that taught by this reference."

In response to Applicants' arguments filed April 11, 1996 [Attachment 2], January 3, 1996 [Attachment 9], and September 29, 1995, paper nos. 53, 50, and 51, as well as the Affidavits filed September 29, 1995 and January 3, 1996 [Attachment 10], paper nos. 49 and 52, the Examiner states they "are not **deemed** to be persuasive", that is it is the Examiner's **opinion** that they are not persuasive.

The Examiner cites In re Brown, 173 USPQ 685, 688; In re Best, 195 USPQ 430; and In re Marosi, 218 USPQ 289, 293 to support his rejection. These decisions are not directed to whether a reference is a valid §102(a) reference and are thus not relevant to this issue.

The Examiner is using Asahi Shinbum [Attachment 6] as a reference under 35 USC §102(a). Applicants disagree that this is proper since to do so does not permit Applicants the one year period provided under 35 USC §102(b) to file a US application after their own publication. The one year period permitted Applicants to file the present application up to September 1987. The date of the Asahi Shinbum article November 28, 1986 is after the date of Applicants' publication, but before the end of the one year.

Applicants believe that the Examiner has incorrectly applied 35 USC §102(a). The Court of Custom and Patent Appeal in In re Katz 215 USPQ 14, 17 states that:

It may not be readily apparent from the statutory language that a printed publication cannot stand as a reference under §102(a) unless it is describing the work of another. A literal reading might appear to make a prior patent or printed publication 'prior art' even though the disclosure is that of the applicant's own work. However, such an interpretation of this section of the statute would negate the one year period afforded under §102(b) during which an inventor is allowed to perfect, develop and apply for a patent on his invention and publish descriptions of it if he wishes.

Thus, one's own work is not prior art under §102(a) even though it has been disclosed to the public in a manner or form which otherwise would fall under §102(a). Disclosure to the public of one's own work constitutes a bar to the grant of a patent claiming the subject matter obvious therefrom only when the disclosure occurred more than one year prior to the date of the application, that is, when the disclosure creates a one-year time bar, frequently termed a "statutory bar," to the application under §102(b). As stated by this court in *In re Facius*, 56 CCPA 1348, 1358, 408 F.2d 1396, 1406, 161 USPQ 294, 302 (1969), **"But certainly one's own invention, whatever the form of disclosure to the public, may not be prior art against oneself, absent a statutory bar."** [Emphasis in original].

The Asahi Shinbum article [Attachment 6] states in the first paragraph, "The possibility of high T, superconductivity has been reported by scientists in Switzerland this spring". The "scientists in Switzerland" are the inventors of the present application. Applicants' invention was reported in Applicants' article [Attachment 3] which was submitted for publication in the Spring of 1986. The Asahi Shinbum article only reports the work of Applicants and that it was reproduced by Prof. Tanaka. This article is a disclosure of Applicants' "own invention" and cannot be used as a reference. Therefore, the Examiner is in error in rejecting Applicants claims under 35 USC §102(a) as anticipated by Asahi Shinbum and under 35 USC §103 as obvious over Asahi Shinbum.

In regard to the two-year grace period under a prior statute corresponding to 35 USC §102(b) the U.S. Supreme Court in *Andrews v. Hovey*, 123 US 267 (1887) states that:

"The evident purpose of the section was to fix a period of limitation which should be certain, and require only a calculation of time, and should not depend upon the uncertain question of whether the Applicant had consented to or allowed the sale or use. Its object was to require the inventor to see to it that he filed his application within two years from the completion of his invention, **so as to cut off all question of the defeat of his patent by a use or sale of it by others more than two years prior to his application**, and thus leave open only the question of priority of invention. The evident intention of congress was to take away the right which existed under the act of 1836 to obtain a patent after **an invention had** for a long period of time **been in public use, without the consent or allowance of the inventor**; it limited that period to two years, **whether the inventor had or had not consented to or allowed the public use.**"
(Emphasis added)

From this quote from *Andrews v. Hovey*, it is evident that the use or sale by others prior to filing a patent application by the inventor does not cut off the inventors right to obtain a patent so long as the inventor files the application within the statutory period which was 2 years at the time of the *Andrews v. Hovey* decision and is now 1 year under 35 USC 102(b). (Applicants note that the U.S. Supreme Court cited *Andrew Hovey* with approval in *Pfaff v. Wells*.) Thus Prof. Tanaka's reproducing of Applicants' results reported in Applicants' article and the reporting of this in *Asahi Shinbum* article does "not cut off [Applicants'] right to obtain a patent" since Applicants have filed the present application within one year of the date of publication of Applicants' article. Applicants

note that the Supreme Court says that "the consent or allowance of the inventor" is not a factor in determining whether "a use" by another cuts off the one year period under §102(b).

The Patent Office Board of Appeals in *Ex parte Powell and Davies*, 37 USPQ 285 states in regard to the publication of applicant's foreign patent application before the filing of a U.S. application on October 5, 1936 on an invention described in the foreign patent application that:

The Examiner has also rejected the claims on the printed specification of Applicants' own British application which appears from this record to have been published on August 27, 1936. We know of no authority for such a rejection. Neither section 3886 nor section 4887 R.S. warrants the rejection. Obviously, the publication could not have a date prior to Applicants' invention. **There is no statute that requires an Applicant to make his invention in this country.**

Therefore, Applicants of the present invention can rely on their publication in *Zeitschrift for Physik* [Attachment 3] as evidence of their invention. Applicants note that the Board states that the statute does not require Applicants to make the invention in this country to get the benefit of the one year period under 35 USC §102(b). Therefore, the date of Applicants' invention is as least as early as the date of Applicants' publication which is before the date of the *Asahi Shinbum* article [Attachment 6].

The Patent Office Board of Appeals in *Ex parte Powell and Davies*, 37 USPQ 285, 286 further states:

The Commissioner indicates in *Ex parte Grosselin* that the Examiner should consider whether the German patent was derived from Applicant and was in effect nothing more than a printed publication of Grosselin's invention.

The Asahi Shinbun article states in the first paragraph:

A new ceramic with a very high T_c of 30K of the superconducting transition has been found. The possibility of high T_c - superconductivity has been reported by scientists in Switzerland this spring. The group of Prof. Shoji TANAKA, Dept. Appl. Phys. Faculty of Engineering at the University of Tokyo confirmed in November, that this is true.

The "scientists in Switzerland" are the inventors of the above-identified application. The Asahi Shinbun article [Attachment 6] only reports the work of Applicants and that it was reproduced by Prof. Tanaka. This article is a disclosure of Applicants' "own invention" and clearly in the words of the Board in *Ex parte Powell and Davies*, "was derived from [Applicants] and [is] in effect nothing more than a printed publication of [Applicants'] own invention and cannot be used as a reference".

The Patent Office Board of Appeals in Ex parte Lemieux 148, 140 states that:

Finally, we believe that our holding is consistent with decisions in interference practice wherein, even though in the usual case a party may not establish a priority date of invention by reference to activity in a foreign country, yet in an originality case where a party is seeking to prove that the other party derived from him so that there is only a single original inventor, he may be permitted to prove derivation by reference to activity abroad. ... By analogy, in the present case appellant has demonstrated that he is the single original inventor, there being no adverse party.

Following this decision it is clear from the Asahi Shinbum article [Attachment 6] that Applicants are the "single original inventor" and that the Asahi Shinbum article is "derived" from Applicants and that Professor Tanaka's work reported in the Asahi Shinbum article [Attachment 6] is "derived" from Applicants as described in Applicants' Article [Attachment 3].

In In re Mathews 161 USPQ 276 (CCPA 1969) a patent to Dewey was cited under 35 USC 102(e) against the application of Mathews. The Dewey patent disclosed but did not claim the invention claimed in the Mathews application. The claimed invention in the Mathews application was a circuit which Dewey disclosed to comply with 35 USC 112 requirements. Mathews submitted Dewey's affidavit under 37 CFR 132 which stated that Mathews disclosed to Dewey the circuit which Dewey described but did not claim. The CCPA held that Dewey was not a reference under 35 USC 102(e) against Mathews application stating 162 USPQ 276, 278:

It necessarily follows that Dewey may not be relied upon to defeat Mathews' application since Dewey's disclosure, *in view of the facts established in the record*, is not inconsistent with the novelty of Mathews' claimed invention. That is, *on the record here*, Dewey derived his knowledge from Mathews who is "the original, first, and sole inventor."

Following *In re Mathews*, it is necessary follows that the Asahi Shinbum article cannot be relied upon under 35 USC 102(a) to defect the present application since the Asahi Shinbum article states that Prof. Tanaka derived his knowledge from Applicants who are the original, first, and sole inventors.

In re Mathews is directed to a reference under 35 USC 102(e) and not under §102(a). But this does not matter since under §102(e) an issued patent (which corresponds to a printed publication under §102(a)) is a reference as of the filing date (which corresponds to the publication date of a printed publication under §102(a)) and not the publication date (the issue date) of the §102(e) cited patent. Also, if the patent cited as a §102(e) reference had issued prior to the filing date of the applicant in *In re Mathews*, it would have been a §102(a) reference. Thus the rational of *In re Mathews* should apply to a reference cited under §102(a). The Asahi Shinbum article [Attachment 6] states that Prof. Tanaka derived his knowledge from Applicants article [Attachment 3] and that Prof. Tanaka reproduced Applicants' work reported in Applicants' article and thus Applicants are the original, first and sole inventor.

In response to Applicants comments on the cited decisions, the Examiner states, "The Applicants cite four decisions which do not directly apply to the present facts."

Applicants disagree.

In regards to In re Katz the Examiner states in the final rejection of the parent application:

(a) The In re Katz decision held that an applicant may overcome an article as 35 USC 102(a) prior art by showing that the applicant was a co-author and that the other co-authors were under the direction and control of the applicant. Here, however, the Applicants were neither co-authors in the Asahi Shinbum article nor did they exercise direction and control over the work reported in that article.

Applicants disagree. The Examiner does not cite the text of In re Katz to support this interpretation of In re Katz. In fact, In re Katz does not support the Examiner's position. In In re Katz an article co-authored by the patent applicant was cited against the Applicants' patent application under 35 USC 102(a). The application was filed less than one year after the article. In determining whether the article was prior art under 35 USC 102(a), the CCPA states "[i]t may not be readily apparent from the statutory language that a printed publication can not stand as a reference under §102(a) unless it is describing the work of another." 215 USPQ 14, 17. The inventor submitted a declaration stating that he was the sole inventor of the subject matter described in the article and that the other authors were students working under his direction. The CCPA

concluded that "The applicant's declaration is sufficient in this case to overcome the rejection" under 35 USC 102(a). 215 USPQ 14, 18. There is no evidence of record that the Asahi Shinbum article [Attachment 6] describes any invention other than those of Applicants. In this regard the CCPA further states:

As an initial matter, we hold that authorship of an article by itself does not raise a presumption of inventorship with respect to the subject matter disclosed in the article. Thus, co-authors may not be presumed to be coinventors merely from the fact of co-authorship. On the other hand, when the PTO is aware of a printed publication, which describes the subject matter of the claimed invention and is published before an application is filed (the only date of invention on which it must act in the absence of other proof), the article may or may not raise a substantial question whether the applicant is the inventor. **For example, if the author (whether he is the applicant or not) specifically states that he is describing the work of the applicant, no question at all is raised.** The content and nature of the printed publication, as well as the circumstances surrounding its publication, not merely its authorship, must be considered. (Emphasis added).

It is clear from this passage that where the authors of an article are not the inventors of an invention described therein, the article is not necessarily a 102(a) reference. The above passage states "if the author (whether he is the applicant or not) specifically states that he is describing the work of Applicants, no question at all is raised", that the article is not a reference under § 102(a). The Asahi Shinbum article [Attachment 6] clearly states that Prof. Tanaka reproduced Applicants work reported in Applicants' article. There can be no question that the Asahi Shinbum article is not a reference

under § 102(a). Moreover, "the content and nature" of the Asahi Shinbum article "as well as the circumstances surrounding the publication" clearly show that it is describing Prof. Tanaka's reproduction of Applicants' work. A published article is an invitation to all readers to reproduce and verify the work reported. Thus the Asahi Shinbum article describes no invention other than that of Applicants.

In regards to *Andrews v. Hovey* the Examiner states:

(b) The *Andrews v. Hovey* decision involved a grace period which is now codified in 35 USC 102(b). The present case involves a printed publication as prior art under 35 USC 102(a).

The Examiner's comments miss the point of *Andrews v. Hovey*. As stated above, this case clearly says that "the use" by others prior to filing of the patent application by the inventors (which would be a §102(a) reference) does not cut off the right of the inventors to obtain a patent on the application filed within the statutory period under §102(b) from the inventors own printed publication. The Asahi Shinbum article [Attachment 6] describes "the use" of Applicants' invention by Prof. Tanaka. If such a use in the United States would not be prior art under §102(a), it is not possible for a printed publication describing such a use in a foreign country to be prior art under §102(a).

In regard to Ex parte Powell and Davies the Examiner states:

- (c) The Ex parte Powell and Davies" decision held that an applicant's own foreign patent which issued within the grace period cannot be used against him or her.

The Examiner's comments miss the point of Ex parte Powell and Davies which explicitly states that "[t]here is no statute that requires an Applicant to make his invention in this country". Applicants initially made their invention in Zurich, before the date of the Asahi Shinbum article [Attachment 6]. Their results were published prior to the Asahi Shinbum article in Applicants' article [Attachment 3] which was in possession of the assignee of the present invention in the US prior to the date of the Asahi Shinbum article. Also, in Ex parte Powel and Davies the Applicant's British application was published before their application was filed in the United States and it was still not a valid §102(a) reference.

In regard to Ex parte Lemieux, the Examiner states:

The Ex parte Lemieux" decision applied that reasoning to an applicant's own article published in another country. Again, the present Applicants had no part in the writing of the Asahi Shinbum article.

Again the Examiner's comments miss the point of Ex parte Lemieux which states "in an originality case where a party is seeking to prove that the other party derived from him so that there is only a single original inventor, he may be permitted to prove derivation

by reference to activity abroad". Here the Asahi Shinbum article [Attachment 6] says that Prof. Tanaka derived his work from the work of Applicants and thus the Asahi Shinbum article [Attachment 6] is not a reference against the present application.

In regard to In re Mathews the Examiner states in the final rejection of the parent application:

"In re Mathews, 161 USPQ 276, 277-279 (CCPA 1969), held that an applicant may overcome a patent as prior art under 35 USC 102(e) with evidence that the applicant provided the knowledge for the disclosure in that patent. By contrast, the present facts involve prior art under 35 USC 102(a) with a publication date before the invention was in this country."

In the present Application the Asahi Shinbum article [Attachment 6] acknowledges that Applicants provided the knowledge to Prof. Tanaka to reproduce Applicants work which is described in Applicants' article [Attachment 3]. And since the Asahi Shinbum article [Attachment 6] refers to Applicants' discovery, as stated above, for this purpose a §102(a) reference is equivalent to a 102(e) reference.

The Examiner further states in the final rejection of the parent application:

(3) The present facts may raise a novel issue of law." The Applicants were the first to develop the presently claimed invention, but the earliest date they can show that invention in this country is December of 1986." The Asahi Shinbum article was published in November of 1986 and describes the development of superconductivity with an oxide of La, Ba,

and Cu having a perovskite structure by a third party, but that article apparently indicates that the third party was confirming the discovery of the present Applicants. Notwithstanding the possible uniqueness of the present facts, however, the Asahi Shinbum article still is deemed to be prior art under 35 USC 102(a), which the Applicants have not been able to overcome with a showing of an earlier date in this country or a showing of their direction and control over the work done by that third party.

35 USC §102(a) and the cited case do not require work at an earlier date in this country to overcome reference cited under §102(a). Also, §102(a) and the cited case law do not require a showing that the Applicants exercised direction and control over Prof. Tanaka or the author of the Asahi Shinbum article [Attachment 6]. In fact, 35 USC §102 and the cited cases require a contrary result as Applicants have shown above. Notwithstanding, Applicants have shown that their conception was in this country in ready to file form, in the possession of the assignee of the present invention, prior to the date of the Asahi Shinbum article [Attachment 6].

Applicants have argued that if one would follow the rationale of the Examiner, that is, if an applicant publishes an article and some other third party reports that same result prior to applicant's filing of a patent application which is subsequently filed within one year of applicant's own publication, the reporting of applicant's work by the third party would be prior art against applicant's application. Such a result would deny (the applicant) the one year grace period provided under 35 USC 102(b). The Examiner dismisses this argument saying in the final rejection of the parent application:

"Applicants" argument is duly noted, but again, it is further noted that the reference is prior art under 35 USC 102(a). The reference is not just a republication of the Applicants' article. Instead, the reference is the reporting of someone else's work which confirms the Applicants' work. The Applicants also are not able to show a priority date which pre-dates the publication of that reference".

The Examiner is ignoring the fact that the Asahi Shinbum article [Attachment 6] and the work of Prof. Tanaka reported on therein was derived from Applicants. The cases cited above clearly state that when a third party derives their knowledge from an applicant, the third party's knowledge, for use or for publication of the information is not prior art against such an Applicants' patent application.

Applicants Have Proven They Can Swear Behind the Reference

Even though, as stated by the U.S. Supreme Court in Pfaff v. Wells, it is not necessary to show anything more than a conception to establish a date of invention under all sections of 35 USC 102 other than §102(g), Applicants have proven by facts that the conception of their invention was in the United States at their direction prior to the date of the Asahi Shinbum article, November 28, 1986, and Applicants have proven that they were diligent from prior to the date of the Asahi Shinbum article by instructing coworkers in the United States until December 3, 1986 which is the date the Examiner believes is the earliest date of Applicants reduction to practice in the United States. (For the reasons of record Applicants believe that they have shown that their invention was reduced to practice in the United States prior to the date of the Asahi Shinbum

article). The examiner has not rebutted Applicants proof that Applicants conception was in the United States at their direction prior to the date of the Asahi Shinbum article and the Examiner has not denied that Applicants have proven that they were diligent by instructing coworkers in the United States from a time prior to the date of the Asahi Shinbum article until the date the Examiner believes is the date of Applicants' date of reduction to practice in the United States. The details of Applicants' proof are discussed at pages 22, line 8 to page 24, last line, of Applicants' Substitute Amendment dated March 6, 1997. That argument is reproduced in detail below.

The Examiner's response to Applicants' proof is at page 19, paragraph d. ii of the final rejection of the parent application "[t]he Applicants further urge that they have shown clear diligence from before November 28, 1996 until actual reduction to practice at or around December 3, 1986. Nevertheless, the actual reduction in this country is deemed to have occurred on December 3, 1986, which is after the publication date for the reference." (As stated above the Examiner is in error that Applicants have to prove reduction to practice in this country before the date of the Asahi Shinbum article to avoid it as a §102(a) reference.)

Willson v. Sherts 81 F 2d 775, 28 USPO 379 (CCPA 1936) held (in an interference) that an inventor who conceives an invention outside of the United States gets the benefit of the date that a third party, to whom the invention is disclosed, brings the conception into the United States (28 USPQ 379, 381) and that acts in this country done on behalf of the inventors can be used to show diligence to reduction to practice

in the United States (28 USPQ 379, 383). Thus, the rejections of Applicants' claims under 35 USC 102 and 103 over the Asahi Shinbum article [Attachment 6] should be withdrawn.

It is noted that in the declaration of co-inventors J. G. Bednorz and K. A. Mueller dated March 21, 1988, mailed into the patent office on June 22, 1988 [Attachment 10A] at paragraph 3, states "On approximately October 16, 1986, we gave Praveen Chaudhari ... six samples of the high temperature superconductive ceramic oxide materials that we had described in our aforementioned Z Physik B. publication. Praveen Chaudhari brought these samples back to the U.S. when he returned after visiting with us on or about October 16, 1986." This is evidence that these samples are brought into the United States on or about October 16, 1986. When these samples came into the United States, since they were inherently superconductive as claimed, the invention was essentially reduced to practice in the United States on that date. It is further noted that the Declaration of Alexis P. Malozenoff signed March 30, 1988 [Attachment 11] states at paragraph 3, "On or about November 15, 1986, Richard Greene and I traveled to Baltimore for a magnetism conference. During our travel to Baltimore, we discussed Greene's ongoing experiments in high T_c superconducting samples which he said had been received from Bednorz and Mueller." This is clear evidence that by November 15, 1986, superconducting samples fabricated by applicant's were being measured in the United States. These samples were inherently superconducting and, consequently, established the reduction to practice in the United States as of that date. The Declaration of Cheng-Chung John Chi dated March 29, 1988 [Attachment 12] states at

paragraph 2, "At a time prior to approximately the middle of November, 1986, Chang C. Tsuei told me a measurement he made on T_c superconducting material which he said were received from Georg Bednorz and K. A. Mueller, two physicists working for IBM Corporation in Zurich, Switzerland ... Chang Tsuei said that he had measured resistivity versus temperature of these samples." This is again further evidence that the Mueller Bednorz superconducting samples were in the United States prior to the middle of November 1986."

In the Affidavit of Sung Il Park, dated March 30, 1988 [Attachment 13], at paragraph 4, it is stated "the preparation in measurement of the aforementioned superconducting samples occurred at a date prior to November 15, 1986, and to the best of my recollection, occurred on or about November 9, 1986, the date when a Helium dower was pumped down preparatory to taking the actual measurement." Therefore, since measurements were taken prior to the date of publication of the Asahi Shinbum article, which was November 28, 1986 the invention was reduced to practice in the US prior to the publication date of the Asahi Shinbum article.

At page 11 of the Examiner's Action dated April 19, 1996, in the paragraph labeled i, the Examiner states "the Applicants argue that Sung Il Park affidavit of March 30, 1988 states at para. 4 that measurements were taken of a superconductive sample on or before November 9, 1986, to the best of affiants recollection, or no later than November 15, 1986. The document evidence is not deemed to support that argument, however." In the paragraph marked (1) on page 11 of PA, the Examiner states "plots of those

measurements are missing. See the Cheng C. Tseui affidavit of March 30, 1998 [Attachment 14], para. 6." This statement comes directly out of Cheng Tseui's Declaration. Notwithstanding, Cheng Tseui's Declaration says the measurements were made, that the plots that were taken were missing. The last sentence of this paragraph states "I believe that they may have been inadvertently thrown away when the laboratory was subsequently extensively cleaned." The Examiner further states "a hand-drawn diagram with the indication of a vacuum pumped down on November 8, 1988 also is not deemed to show that the measurements were taken." The Examiner is referring to paragraph 5 of the Cheng Tseui Declaration and Exhibit C which contains the hand-drawn figure.

At paragraph (2) of page 11 of the Examiner's Action dated April 19, 1996, the Examiner points to cablegrams sent by Dr. Greene to Applicants in Zurich which are attached as Exhibit B to his Declaration [Attachment 15]. The Examiner states "Dr. Greene reports that no indication of superconductivity has been seen in his specific heat measurements for temperature 4-35°K." The Examiner fails to note that in the same cablegram dated November 11, 1986, Dr. Greene states "this is not really too surprising given the very broad transition to have found in resistivity and susceptibility." The Examiner acknowledges that "Exhibit C has pages dated December 1, 1986 on in Exhibit D, which actually has plots and resistance versus temperature dated as early as December 3, 1986." The Examiner is conceding that high T_c superconductivity was measured on the samples which the very same set of cablegrams and affidavit say were in the United States in the middle of November 1986. Consequently, by

Examiner's own admission, samples which were in the United States were clearly shown to be superconducting as of December 3, 1986. Consequently, the samples that were in the United States as of November 9 were inherently superconducting. It is clear from the same declarations [Attachment 15] that Applicants' were communicating with Dr. Greene. It is noted that Dr. Greene's cablegram dated November 25, 1986 to Applicants states he will resume work on the new superconductor and that not much will happen because of the Thanksgiving Holiday until the following week. There are cablegrams dated November 26, December 1, December 2, 1986 related to high T_c superconductivity. Dr. Greene's Exhibit C has notebook pages dated December 1, 1986 to December 5, 1986. The December 5, 1986 shows T_c of 26°K and 30°K. Exhibit D show a plot of R vs. T dated December 8, 1986. Clear reduction to practice is shown and clear diligence is shown from prior to the date of the Asahi Shinbum article [Attachment 6]. This was clearly done in close correspondence with the Applicants. Thus, the facts clearly shown applicant's can swear behind the Asahi Shinbum reference.

The Examiner repeats the same arguments in the final rejection of the parent application without rebutting Applicants' arguments and proof that their conception was in this country at their direction and that their co-inventors in this country under their direction diligently pursued a reduction to practice in this country the earliest date of which according to the Examiner is December 3, 1986.

**Applicants Invention Was Reduced To Practice In the US Before
The Asahi Shinbum Article**

Attachment 41 of this response is a copy of a letter from C. W. Chu to Applicants dated December 3, 1986. This letter states:

This is just to inform you that my group at the U. of Huston has reproduced your results (Z. Phys. B 64, 189 (86)) three weeks ago. ... I believe it is superconductivity.

A journal article is an invitation to any one to reproduce the work reported therein . Thus a reader of the article is for that purpose under the direction and control of the author. Thus Applicants invention was reduced to practice in this country prior to the date of the Asahi Shinbum article at the direction and control of Applicants.

The Examiner in the final rejection of the parent application repeats the earlier rejection stating:

- i. The Applicants argue that the Sung 11 Park Affidavit of March 30, 1988 states at para. 4 that measurements were taken of a superconductive sample on or before November 9, 1986, to the best of the affiant's recollection, or no later than November 15, 1986. The documentary evidence is not deemed to support that argument, however. See MPEP 715.07.

(1) Plots of those measurements are missing. See the Chang C. Tsuei Affidavit of March 30, 1988, para. 6. A hand-drawn diagram with the indication of vacuum pumping on November 9, 1988 also is not deemed to show that the measurements were taken.

(2) Moreover, the other evidence in the record appears to show that high temperature superconductivity was not attained in this country as of November 9 or 15, 1986. The March 30, 1986 Declaration of Richard L. Greene includes a series of cablegrams sent by Dr. Greene to the Applicants in Zurich, Switzerland as Exhibit B. On both November 11, 1986 and November 14, 1986, Dr. Greene reports that no indication of superconductivity has been seen in his specific heat measurements for temperatures of 4-35°K. Exhibit C has pages dated December 1, 1986 on, and Exhibit D, which actually has plots of resistance vs. temperature, has an earliest date of December 3, 1986.

i. The Applicants argue that "Praveen Chaudhari brought these samples back to the U.S. when he returned after visiting (the inventors) on or about October 16, 1986. When these samples came into the United States since they were inherently superconductive as claimed, the invention was essentially reduced to practice in the United States on that date." As stated before repeated above, however, the Applicants were unable to show the attainment of superconductivity any earlier than December 3, 1986 in this country. Again, the present invention is directed to the method of superconducting electricity. That method apparently was not reduced to practice before December 3, 1986.

ii. The Applicants further urge that they have shown clear diligence from before November 28, 1986 until actual reduction at or around December 3, 1986. Nevertheless, the actual reduction in this country is

deemed to have occurred on December 3, 1986, which is after the publication date for the reference.

iii. The Applicants assert that they should be entitled to a one-year grace period for their own published invention, but this prior art rejection is based on 35 USC 102(a) because the author of that reference is a different inventive entity.

19 The Applicants' proposed priority date for the EPO application is January 23, 1987, which is after the December 1986 dates shown by the Richard L. Greene Affidavit.

In these repeated rejections the Examiner has not responded to Applicants' arguments and thus has not rebutted any of them. Therefore, the Examiner concedes that Applicants' conception was in this country at their direction prior to the date of the Asahi Shinbum article [Attachment 6] and that coworkers in this country at Applicants' direction diligently reduced their invention to practice in the United States.

Therefore, it is respectfully requested to reverse the rejection of claims under 35 USC § 102(a) as anticipated by Asahi Shinbum article [Attachment 6].

CLAIM REJECTIONS - 35 USC § 103

Claims 24-26, 86-90, 96-135 and 137-177 of the final rejection of the parent application have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Asahi Shinbum article. These claims correspond to claims 232-234, 255-279 and 281-321 herein.

Claim 136 of the parent application was allowed over the Asahi Shinbum article since according to the Examiner the examples in the present specification were deemed to show criticality for the formula of claim 136. Claim 136 corresponds to claim 280 of the present application.

Since the present application was filed within one year of Applicants' article, Applicants' article [Attachment 3] is not a reference as to them (even though it would be a reference as to a third party). Thus the only portion of the Asahi Shinbum article relevant to Applicants' claims is:

A new ceramic with a very high T_c of 30K of the superconducting transition ... is an oxide compound of La and Cu with Barium which has a structure of the so-called perovskite and shows metal-like properties.

Since the Asahi Shinbum article refers to " T_c of 30K" and since each of Applicants claims recites $T_c \geq 26^\circ\text{K}$, the Asahi Shinbum article alone cannot anticipate $T_c \geq 26^\circ\text{K}$ since to be an anticipation a reference must contain all the limitations of the claim it is said to anticipate. Also, the Asahi Shinbum article [Attachment 6] provides no teaching

of how to made the "new ceramic". A reference which does not provide a method of making a composition cannot anticipate a claim to the composition and thus to a use of that new composition. Also, the Asahi Shinbum article has no specific embodiment of the new composition. Thus it cannot anticipate under 35 USC 102. If as to Applicants the Asahi Shinbum article is not a valid §102 reference, the Asahi Shinbum article cannot render Applicants' claims obvious since to do so would render the Asahi Shinbum article a valid §102 reference against Applicants.

As stated above the examiner's characterization of the Asahi Shinbum article does not accurately represent the teaching of this article.

Applicants' article which is incorporated in Applicants' specification and priority document is directed to a Ba-La-Cu-O system. Applicants' article [Attachment 3] was submitted for publication on April 17, 1986 to Z. Phys. B from the IBM Zurich Research Laboratory in Switzerland. Thus the only teaching in the Asahi Shinbum article [Attachment 6] relevant to Applicants' claimed invention is the teaching in Applicants' article which is incorporated by reference in the present application and referred to in the priority document. The Asahi Shinbum article provides no teaching relevant to Applicants' claimed invention other than the teaching in Applicants' article on how to make the ceramic "newly discovered" by Applicants. The Asahi Shinbum article states the Applicants' "newly discovered" ceramic "is an oxide compound of La and Cu with Barium which has a structure of the so-called perovskite and shows metal-like properties". This is described in detail in Applicant's article. Thus the examiner is

stating that it is obvious to a person of skill in the art to practice the invention of all of Applicants' non-allowed claims from the teaching of the Asahi Shinbum article which is the teaching of Applicants' specification which incorporates Applicants' article by reference. Applicants note that they received the Nobel Prize in Physics in 1987 for their discovery reported in Applicants article. Since Prof. Tanaka apparently only reproduced Applicants work based on Applicants' article, he did not share in the Nobel prize. Therefore, the examiner is stating that all of Applicants non-allowed claims are obvious in view of Applicants' teaching.

Alternatively, the examiner is stating that all of applicant's non-allowed claims are obvious in view of the Asahi Shinbum article's [Attachment 6] statement that "[a] new ceramic with a very high T_c of 30 K of the supper conductive transition has been found. ... The ceramic newly discovered, is an oxide compound of La and Cu with Barium which has a structure of the so-called perovskite and shows metal-like properties. " Thus the examiner is stating that once a person of ordinary skill in the art knows that "an oxide compound of La and Cu with Barium which has a structure of the so-called perovskite and shows metal-like properties " has a "a very high T_c of 30 K" the inventions of all of Applicants non-allowed claims can be made and used by such a person of ordinary skill in the art without any additional teaching other than what is known by a person of ordinary skill.

Applicants acknowledge that if a material is known to be a superconductor, a person of skill in the art would know to cool the material to below the T_c and to flow a superconducting current therein at that temperature. Prior to the date of Applicants' invention, which is at least as early as the date on which Applicants' article was published by Z. Phys. B no one knew that transition metal oxides had a $T_c \geq 26^\circ\text{K}$ except for Applicants. As stated above the Asahi Shinbum article describes no invention other than that of Applicants and is thus not a valid reference.

Therefore, it is respectfully requested to withdraw the rejection of claims under 35 USC §103 as obvious over the Asahi Shinbum article.

OBJECTION TO THE SPECIFICATION UNDER 35 USC 112

The Examiner states in the final rejection of the parent application:

5. The specification is objected to under 35 U.S.C. § 112, first paragraph, as failing to provide an enabling disclosure commensurate with the scope of the claims.

Applicants disagree. The specification incorporates by reference Applicants' article [Attachment 3]. In the rejection under 35 USC 102 and 103 over the Asahi Shinbum article [Attachment 6], the examiner has stated that a person of skill in the art is enabled to practice the inventions of Applicants' non-allowed claims by the mere statement that a Ba-La-Cu-O compound has been confirmed to be superconductive as described by Applicants in their article. The examiner's objection to the specification is inconsistent with the examiner's rejection under 35 USC 102(a) and 103(a).

The text of the Asahi Shinbum article [Attachment 6] merely states that Prof. Tanaka reproduced Applicants' work. Thus, the Examiner has stated that all of the inventions of Applicants' non-allowed claims are contained within the Asahi Shinbum article and thus are fully enable by Applicants' article. The Examiner has also rejected all of Applicants' non-allowed claims under 35 USC §103(a) in view of the Asahi Shinbum article. This means that nothing more is needed than what is described in Applicants' article and ordinary skill to practice all of Applicants non-allowed claims.

The Examiner further states in the final rejection of the parent application:

- a. The present specification is deemed to be enabled only for compositions comprising $\text{Ba}_x\text{La}_{5-x}\text{CuO}_y$.

The Examiner again used the terminology “deemed” which means that it is the Examiner’s conclusory unsupported “opinion”. The Examiner has introduced no factual evidence to support the Examiner’s “opinion” that “[t]he present specification is deemed to be enabled only for compositions comprising $\text{Ba}_x\text{La}_{5-x}\text{CuO}_y$.” As shown below, the specification cites a substantially large number of specific compositions, and provides sufficient teaching to enable a person of skill in the art to practice Applicants’ invention.

The Examiner further states in the final rejection of the parent application:

The art of high temperature (above 30 K) superconductors is an extremely unpredictable one. Small changes in composition can result in dramatic changes in or loss of superconducting properties. The amount and type of examples necessary to support broad claims increases as the predictability of the art decreases. Claims broad enough to cover a large number of compositions that do not exhibit the desired properties fail to satisfy the requirements of 35 USC 112. Merely reciting a desired result does not overcome this failure. In particular, the question arises: Will any layered perovskite material containing copper exhibit superconductivity? Also, does any stoichiometric combination of rare earth, an alkaline earth, and copper elements result in an oxide superconductor?

The Examiner provides no factual evidence to support the statement "[t]he art of high temperature (above 30 K) superconductors is an extremely unpredictable one." This is an opinion of the Examiner. As shown herein the basic theory of Superconductivity has been known since 1911 as indicated in the book by von Laue "Theory of Superconductivity" [Attachment 42]. The Examiner should withdraw the rejection, provide factual evidence to support the opinion or submit an examiner's affidavit under MPEP 706.02(a) qualifying himself as an expert in the art of high T_c superconductors to offer such a conclusory opinion. It is Applicants' teaching that controlling the amount of the constituents of the composition, such as oxygen content, effect the superconductive properties of the composition. It is a matter of routine experimentation to find the optimum constituents, such as oxygen content, for a particular high T_c superconducting composition. Applicants do not have to provide experimental results for every composition that fall within the scope of their claims when a person of skill in the art exercising routine experimentation has a reasonable expectation of success following Applicants teaching to achieve a composition through which can be flowed a superconducting current according to the teaching of Applicants' specification.

According to *In re Angstadt* 190 USPQ 214, 218 in an unpredictable art, §112 does not require disclosure of a test with every species covered by a claim. The CCPA states:

To require such a complete disclosure would apparently necessitate a patent application or applications with "thousands" of examples or the disclosure of "thousands" of catalysts along with information as to whether each exhibits catalytic behavior resulting in the production of

hydroperoxides. More importantly, such a requirement would force an inventor seeking adequate patent protection to carry out a prohibitive number of actual experiments. This would tend to discourage inventors from filing patent applications in an unpredictable area since the patent claims would have to be limited to those embodiments which are expressly disclosed. A potential infringer could readily avoid "literal" infringement of such claims by merely finding another analogous catalyst complex which could be used in "forming hydroperoxides."

The Examiner provides no evidence to support the examiner's statement that "[t]he amount and type of examples necessary to support broad claims increases as the predictability of the art decreases." The examiner has provided no evidence that the predictability of art of high T_c superconductivity is low. The Examiner's statement that "[c]laims broad enough to cover a large number of compositions that do not exhibit the desired properties fail to satisfy the requirements of 35 USC 112." implies that Applicants' claims "cover a large number of compositions that do not exhibit the desired properties" of high T_c superconductors. The Examiner has provided no evidence to support the examiners' implication. In fact, the claims do not cover any compositions that do not exhibit the desired properties of high T_c superconductors. Applicants' claims only cover superconductors having $T_c \geq 26^\circ\text{K}$ which carry a superconductive current. Applicants' claims are not composition of matter claims.

The Examiner's attention is directed to the following comments from the specification at page 1, lines 5-10:

"This invention relates to ... superconducting compositions including copper and/or transition metals."

The specification further states at page 5, lines 2-9 that:

It is another object of the present invention to provide novel superconductive materials that are multi-valent oxides including transition metals, the compositions having a perovskite-like structure.

It is a further object of the present invention to provide novel superconductive compositions that are oxides including rare earth and/or rare earth-like atoms, together with copper or other transition metals that can exhibit mixed valent behavior.

The specification further states at page 8, lines 1-11, that "[A]n example of a superconductive composition having high T_c is the composition represented by the formula RE-TM-O, where RE is a rare earth or rare earth-like element, TM is a nonmagnetic transition metal, and O is oxygen. Examples of transition metal elements include Cu, Ni, Cr etc. In particular, transition metals that can exhibit multi-valent states are very suitable. The rare earth elements are typically elements 58-71 of the periodic table, including Ce, Nd, etc. If an alkaline earth element (AE) were also present, the composition would be represented by the general formula RE-AE-TM-O."

And at page 7, lines 14-15, the specification states that "the rare earths site can also include alkaline earth elements."

The specification further states at page 11, lines 19-24, that "An example of a superconductive compound having a layer-type structure in accordance with the present invention is an oxide of the general composition RE_2TMO_4 , where RE stands for the rare earths (lanthanides) or rare earth-like elements and TM stands for a transition metal."

The composition $RE_2TMO_4:RE$ is referred to at page 24, lines 5-9; $RE_{2-x}TM_xO_{4-y}$ is referred to at page 25, lines 19-21.

The following specific compounds are recited in the application:

$Ba_4La_{5-x}Cu_5O_{5(3-y)}$ at page 10, lines 4, 10, 14.

$La_{2-x}Ba_xCuO_{4-y}$ at page 12, line 13

$La_{2-x}Ba_xNiO_{4-y}$ at page 12, line 13

$La_{2-x}Sn_xNiO_{4-y}$ at page 12, line 17

$Ce_{2-x}Cu_xNiO_{4-y}$ at page 12, line 19

La_2CuO_4 at page 12, line 21

La_2CuO_{4-y} with Sr^{2x} , Ba^{2x} and Ca^{2x} substitution at page 13, line 17

$La_{2-x}Sn_xCuO_{4-y}$ at page 17, line 21

$La_{2-x}Ca_xCuO_{4-y}$ at page 17, line 21

$La_{2-x}Ba_xCuO_{4-y}$ at page 18, line 6

$La_2CuO_4:Ba$ at page 18, line 15

$La_2CuO_4:Ba$ at page 24, line 6

$\text{Nd}_2\text{NiO}_4:\text{Sn}$ at page 24, line 9

$\text{La}_2\text{CuO}_{4-y}$ doped with Sn^{2x} , Ca^{2x} and Ba^{2x} at page 25, lines 6-18

Other compounds are given in the articles to B. Raveau, in Mat. Res. Bull., Vol. 20 (1985) pp. 667-671 [Attachment 15A], and to C. Michel et al. in Rev. Claim. Min. 21 (1984) 407 [Attachment 15B], both of which are incorporated by reference at page 13, lines 4-5.

The Examiner cites In re Fisher, 166 USPQ 18, In re Angstadt and Griffen, 150 USPO 214, and In re Golianni, 195 USPQ 150, in support of the statement "[t]he amount and type of examples necessary to support broad claims increases as the predictability of the art decreases".

The claims under appeal In re Fisher are directed to increasing the potency of substances containing ACTH hormones for injection into human beings. In regards to the rejection for insufficient disclosure under 35 USC 112 the CCPA states that:

"the issue thus presented is whether an inventor with the first to achieve potency of greater than 1.0 for certain types of compositions, which potency was long desired because of its beneficial effects on humans, should be allowed to dominate *all* compositions having potencies greater than 1.0, thus including future compositions having potencies in excess of those obtainable from his teachings plus ordinary skill." 166 USPQ 18, 23-24 (emphasis in the original).

The CCPA goes on to say in In re Fisher that:

"It is apparent that such an inventor should be allowed to dominate the future patentable inventions of others where those inventions were based in some way on his teachings. Such improvements, while unobvious from his teachings, are still within his contribution, since the improvement was made possible by his work. It is equally apparent, however, that he must not be committed to achieve this dominance by claims which are insufficiently supported and hence, not in compliance with the first paragraph of 35 USC 112. That paragraph requires that the scope of the claims must bear a reasonable correlation to the scope of enablement provided by the specification to persons of ordinary skills in the art... In cases involving unpredictable factors, such as most chemical reactions... the scope of enablement obviously varies inversely with the degree of unpredictability of the factors involved." (166 USPQ 18, 24)

Applicants of the present invention have provided the first teaching that transition metal oxides can form a superconductor having a critical temperature in greater than or equal to 26°K, therefore, "is apparent that such an [applicant] should be allowed to dominate the future patentable inventions of others when those inventions [are based in some way on Applicants] teaching" as stated by the CCPA in In re Fisher Supra.

In the present invention Applicants are acknowledged to be the pioneers of high T_c superconducting metal oxides. The Examiner has produced no evidence that invention

which come within the scope of Applicants' claim cannot be achieved by persons of skill in the art based on Applicants teaching. The affidavits of Mitzi [Attachment 16], Dinger [Attachment 17], Tsuei [Attachment 18], Shaw [Attachment 19] and Duncombe [Attachment 20] and the book of Poole et al. state [Attachment 21] it is straight forward to use the general principles of ceramic science to make high T_c superconductors following Applicants teaching.

The claimed invention in re Angstadt and Griffen (190 USPQ 214) involves a methods of catalyically oxidizing alkylaromatic hydrocarbons to form a reaction comprising the corresponding hydroperoxides. The method employs catalysts. The Examiner rejected all the claims under 35 USC 112, first and second paragraphs. The Board's rational for affirming the Examiner's rejection was directed primarily to the enablement required of the first paragraph.

The CCPA reversing stated that:

"what is a maximum concern in the analysis of whether a particular claim is supported by the disclosure in an application, is whether the disclosure contains sufficient teaching regarding the subject matter of the claims as enabled one of skill in the art to make and to use the claimed invention. These two requirements 'how to make' and 'how to use' have some times been referred to in combination as the 'enablement requirement'... The relevancy may be summed up as being whether the scope of enablement provided to one of ordinary skill in the art by

the disclosure as such as to be commensurate with the scope or protection sought by the claims. (190 USPQ 214,47 citing In re Moore 169 USPQ).

In the attached affidavits under 37 CFR 132, Dr. T. Dinger [Attachment 17], Dr. Tsuei [Attachment 18], Dr. Shaw [Attachment 19], Mr. Duncombe [Attachment 20] and Dr. D. Mitzi [Attachment 16] state:

"That once a person of skill in the art knows of a specific transition metal oxide composition which is superconducting above 26°K, such a person of skill in the art, using the techniques described in the above-identified patent application, which includes all known principles of ceramic fabrication, can make the transition metal oxide compositions encompassed by claims 24-26, 86-90 and 96-108, without undue experimentation or without requiring ingenuity beyond that expected of a person of skill in the art. This is why the work of Bednorz and Müller was reproduced so quickly after their discovery and why so much additional work was done in this field within a short period of their discovery."

In the paragraph at the bottom of page 15 of the specification, it is stated that: in regard to compositions according to the present invention that "their manufacture generally follows the known principles of ceramic fabrication." Thereafter, an example of a typical manufacturing process is given.

The CCPA in *In re Angstadt and Griffen* further states that:

"we cannot agree with the Board that Appellants' disclosure is not sufficient to enable one of ordinary skill in the art to practice the invention without undue experimentation. We note that many chemical processes and catalytic processes particularly, are unpredictable, ... , and the scope of enablement varies inversely with the degree of unpredictability involved... The question, then, whether in an unpredictable art, section 112 requires the disclosure of a test with every species covered by a claim. To require such a complete disclosure will apparently necessitate a patent application or applications with 'thousands ' of examples... . More importantly, such a requirement would force an inventor to seek adequate patent protection to carry out a prohibited number of natural experiments. This would tend to discourage inventors in filing patent applications in an unpredictable area since the patent claim would have to be limited those embodiments which are expressly disclosed. A potential infringer could readily avoid 'infringement of such claims' by merely finding another analogous (example) which could be used..." 190 USPQ 124, 218.

The CCPA in *In re Angstadt* further goes on to say

"having decided that appellants are *not* required to disclose every *species* encompassed by the claims even in an unpredictable art such as the present record presents, each

case must be determined on its own facts." 190 USPQ 214, 218. (emphasis in the original).

In regards to the catalyst In re Angstadt and Griffen CCPA further states:

"since appellants have supplied the list of catalysts and have taught how to make or how to use them, we believe that the experimentation required to determine which catalyst will produce hydroperoxide would not be undo and certainly would not 'require ingenuity beyond that to be expected of one of ordinary skill in the art'. 190 USPQ, 214, 218 in re Field v. Conover 170 USPQ, 276, 279 (1971).

As stated in the affidavits of Dr. Dinger [Attachment 17], Dr. Tsuei [Attachment 18], Dr. Shaw [Attachment 19], Mr. Duncombe [Attachment 20] and Dr. Mitzi [Attachment 16], to make the high temperature superconductors encompassed by Applicants' claims, using the teaching of the present invention would not require ingenuity beyond that expected of one of ordinary skill in the art.

The CCPA in In re Angstadt further states that:

"the basic policy of the Patent Act, which is to encourage disclosure of inventions and thereby to promote progress in the useful arts. To require disclosures in patent applications to transcend the level of knowledge of those skilled in the art would stifle the disclosure of inventions in fields man understands imperfectly." 190 USPQ 214, 219.

The CCPA further states that:

"the certainty which the law requires in patents is not greater than is reasonable." 242 USPQ, 270-271, cited in *In re Angstadt*. 190 USPQ 214, 219.

In re Angstadt further states at 190 USPQ 219:

We note that the PTO has the burden of giving reasons, supported by the record as a whole, why the specification is not enabling. *In re Armbruster*, 512 F.2d 676, 185 USPQ 152 (CCPA 1975). Showing that the disclosure entails undue experimentation is part of the PTO's initial burden under *Armbruster*; this court has never held that evidence is necessary for any experimentation, however slight, is sufficient to require the applicant to prove that the type and amount of experimentation needed is not undue.

By calling the claimed "invention" the "scope of protection sought" the dissent obscures the problem and frustrates the intended operation of the patent system. Depriving inventors of claims which adequately protect them and limiting them to claims which practically invite appropriation of the invention which avoiding infringement inevitably has the effect of suppressing disclosure. What the dissent seem to be obsessed with is the thought of catalysts which won't work to produce the intended result. Applicants have enabled those in the art to see that this is a real possibility,

which is commendable frankness in a disclosure. Without undue experimentation or effort or expense the combinations which do not work will readily be discovered and, of course, nobody will use them and the claims do not cover them. The dissent wants appellants to make everything predictable in advance, which is impracticable and unreasonable.

We hold that the evidence as a whole, including the inoperative as well as the operative examples, negates the PTO position that persons of ordinary skill in this art, given its unpredictability, must engage in undue experimentation to determine which complexes work. The key word is "undue," not "experimentation."

The only facts which the Examiner offers as evidence of unpredictability are examples provided in Applicants' specification. The CCPA in *In re Angstadt* says that this is "commendable frankness" which is not to be held against Applicants. The Examiner has provided no evidence that a person of skill in the art has to engage in undue experimentation to practice Applicants non-allowed claims. The affidavits of Mitzi [Attachment 16], Dinger [Attachment 17], Tsuei [Attachment 18], Shaw [Attachment 19] and Duncombe [Attachment 20] and the book of Poole et al. [Attachment 21] indicate that persons of skill in the art do not have to engage in undue experimentation to practice Applicants' invention.

The Examiner cited In re Colianni 195 USPQ 150 which Applicants believe is not on point since in In re Colianni "[t]here is not a single specific example or embodiment by way of an illustration of how the claimed method is to be practiced." (195 USPQ 150, 152). In contradistinction as noted above, there are numerous examples cited in Applicants' specification and incorporated references. Thus this decision is not on point.

"Showing that the disclosure entails undue experimentation is part of the PTO's initial burden." In re Armbruster 185 USPQ 152, 504.

"The practical approach followed consistently by [the CCPA] ..., places the initial burden on the PTO to show that the enabling disclosure is not commensurate in scope with the claim. Upon such a showing, the burden of rebuttal shifts to Applicants". In re Coliani 195 USPQ 150.

"However, [the CCPA] has made it clear that the Patent and Trademark Office must substantiate its rejections for lack of enablement with reasons" In re Armbruster 185 USPQ 152, 153.

The Examiner has merely asserted without support that "the art of high temperature superconductivity is unpredictable...".

The CCPA in *In re Marzocchi*, 58 CCPA 1069, 439 F. 2d 220, 169 USPQ 367, 369-370 (1971) states:

"The only relevant concern of the Patent Office under these circumstances should be over the *truth* of any such assertion. The first paragraph of §112 requires nothing more than objective enablement. How such a teaching is set forth, either by the use of illustrative examples or by broad terminology, is of no importance.

As a matter of Patent Office practice, then, a specification disclosure which contains a teaching of the manner and process of making and using the invention in terms which correspond in scope to those used in describing and defining the subject matter sought to be patented *must* be taken as in compliance with the enabling requirement of the first paragraph of §112 *unless* there is reason to doubt the objective truth of the statements contained therein which must be relied on for enabling support. Assuming that sufficient reason for such doubt does exist, a rejection for failure to teach how to make and/or use will be proper on that basis; such a rejection can be overcome by suitable proofs indicating that the teaching contained in the specification is truly enabling...

[I]t is incumbent upon the Patent Office, whenever a rejection on this basis is made, to explain *why* it doubts the truth or accuracy of any statement in a supporting disclosure and to back up assertions of its own with acceptable evidence or reasoning which is inconsistent with the contested statement. Otherwise, there would be no need for the applicant to go to the trouble and expense of supporting his presumptively accurate disclosure. [Emphasis in original footnote deleted].

Applicants have submitted herewith affidavits of Dr. Mitzi [Attachment 16], Dr. Tsuei [Attachment 18], Dr. Shaw [Attachment 19], Mr. Duncombe [Attachment 20] and Dr. Dinger [Attachment 17] under 37 CFR 132 which state, as quoted above, that once a person of skill in the art knows of Applicants' work, the compositions encompassed by the claims under experimentation, can be made using the teaching of Applicants without undue experimentation.

Thereby rebutting the Examiner's statement that:

"[the specification ... [fails] to provide an enabling disclosure commensurate with the scope of the claims."

The Examiner cites *In re Cooks and Cosden Oil v. American Hoechst* to support the statement "[c]laims broad enough to cover a large number of compositions that do not exhibit the desired properties fail to satisfy the requirement of 35 USC 112." Applicants claims do not read on any inoperative specifies since Applicants' claims are apparatus of use claims. A composition which does not have a $T_c \geq 26^\circ\text{K}$ is not within the scope of the claims. Thus these decisions are not on point.

The Examiner cites *In re Corkill* as support for this statement "[m]erely reciting a desired result does not overcome this failure". The CAFC held "[c]laims which include a substantial measure of inoperatives ... are fairly rejected under 35 USC 112."

Applicants' claims include no inoperatives. Since Applicants claims are apparatus for use claims they are functional and thus exclude inoperatives. "[T]he use of functional

language is sanctioned specifically by ... section 112." In re Angstadt 190 USPQ 214, 217.

The Examiner cited Brenner v. Manson for the statement "a patent is not a hunting license. It is not a reward for the search, but a reward for its successful conclusion." The claim in question was a method of making a composition. The composition had no known use. The method was found to lack utility and thus is not be patentable. This is not relevant to §112, first paragraph. Thus this decision is not on point. Moreover, Applicants have had a successful conclusion, they won a Nobell Prize and initiated and enabled the high T_c art.

The Examiner queries "[w]ill any layered perovskite material containing copper exhibit superconductivity?" and "does any stoichiometric combination of rare earth, an alkaline earth, and copper elements result in an oxide superconductor?" Since Applicants claims are directed to apparatus of using compositions, Applicants' claims read on only those layered perovskite materials which exhibit superconductivity with a $T_c \geq 26^\circ\text{K}$ and do not read on apparatus of use of compositions which are not superconductive. Thus the Examiner's queries is not relevant to Applicants claims. Applicants are not claiming a composition which is a high T_c superconductor. Thus Applicants claims do not read on any layer perovskite, or any other stoichiometric combination, but only on those apparatus carrying a high T_c superconducting current. Apparatus of use claims are inherently narrower in scope than composition claims.

The paragraph bridging pages 13 and 14 refer to Ba-La-Cu-O systems having different crystallographic phases having Cu^{3+} and Cu^{2+} ions or Ni^{3+} and Ni_{2+} ions.

Claim 247 of the present invention recites "a copper oxide compound having a layer-type-perovskite-like crystal structure, the copper oxide compound including at least one rare-earth or rare-earth-like element, and at least one alkaline-earth element". In regard to the stated elements, the rare earth elements are defined in the specification at page 7, lines 9-12 to be "a group IIIB element, such as La." Group IIIB includes Sc, Y, La and Ac, rare earth-like or near rare earth. The rare earth elements are elements 58 to 71. This group contains four elements from group IIIB and fourteen elements from the rare-earth for a total of 18 elements. The alkaline earths contain the elements of Group A which has 6 elements.

The Examiner further states in the final rejection of the parent application:

It should be noted that at the time the invention was made, the theoretical mechanism of superconductivity in these materials was not well understood. That mechanism still is not understood. Accordingly, there appears to be little factual or theoretical basis for extending the scope of the claims much beyond the proportions and materials actually demonstrated to exhibit high temperature superconductivity. A "patent is not a hunting license. It is not a reward for the search, but a reward for its successful conclusion".

The Examiner has provided no evidence to support the statement "that at the time the invention was made, the theoretical mechanism of superconductivity in these materials was not well understood. That mechanism is still not understood." Applicants request the Examiner to introduce evidence to support this statement or to place an Examiner's affidavit under MPEP 706.02(a) qualifying the Examiner as an expert to make this statement. The Examiner further states "there appears to be little factual or theoretical basis for extending the scope of the claims much beyond the proportions and materials actually demonstrated to exhibit high temperature superconductivity." This is the Examiner's unsupported opinion. The five affidavits of Mitzi [Attachment 16], Dinger [Attachment 17], Tsuei [Attachment 18], Shaw [Attachment 19] and Duncombe [Attachment 20] under 37 CFR 1.132 and the book to Poole et al. [Attachment 21] described below provide factual evidence supporting Applicants position that once a person of skill in the art knew from Applicant's article that compositions, such as transition metal oxides, were high T_c superconductors, it was a matter of routine application of the general principles of ceramic science to fabricate compositions, such as transition metal oxide superconductors, other than those actually made by Applicants. Quoting "Brenner v. Manson", 283 US 518, 148 USPQ 689, the Examiner further states that a "patent is not a hunting license. It is not a reward for the search, but a reward for its successful conclusion." The evidence introduced by Applicants clearly shows that Applicant's article upon which the present application is based had a very successful conclusion. Applicants started the field of high T_c superconductivity. All the further developments were based on Applicants teaching. Moreover, the issue in Brenner v. Manson was the patentability of a method to fabricate a composition. The

composition had no use. The method was found not patentable for lack of utility. To issue a patent for such a process would be granting a hunting license for a utility that may occur in the future. This case has nothing to do with §112 enablement.

In view of the above Applicants request withdrawal of Examiner's objection to the specification.

CLAIM REJECTIONS UNDER 35 USC §112, FIRST PARAGRAPH

Claims 24-26, 86-90, 96-113, 129-131, 134, 135, and 139-177 of the parent application were rejected under 35 U.S.C. § 112, first paragraph, for the same reasons set forth by the Examiner in the objection to the specification. These claims correspond to claims 232-257, 273-275, 278, 279 and 283-321. Applicants disagree for the same reasons why Applicants disagreed to the objection to the specification above. The Examiner provided specific comments only in regards to claims 24, 86, 88, 96 and 103 of the parent application.

Applicants disagree with the Examiner's statement that Applicants' arguments filed April 11, 1996, January 3, 1996, and September 29, 1995, paper nos. 53, 50, and 51, as well as the Affidavits filed September 29, 1995 and January 3, 1996, paper nos. 49 and 52, have been fully considered but they are not deemed to be persuasive. The arguments of those papers are incorporated herein by reference. Since the entire ancestral file history of the present application is being submitted in a subsequent paper, these papers incorporated by reference are formally included in the record of this application.

The Examiner further states in the final rejection of the parent application:

"The additional case law and arguments by the Applicants have been duly noted. For the reasons that follow, however, the record as a whole is deemed to support the initial determination that the originally filed

disclosure would not have enabled one skilled in the art to make and use the invention to the scope that it is presently claimed.”

The Examiner again uses the word “deemed”, that is, it is the Examiner’s conclusory opinion unsupported by any factual evidence. The quoted passage is completely contrary to the Examiner’s rejection under 35 USC 102(a) and 103(a). Under these rejections the Examiner found the Asahi Shinbum article [Attachment 6] would have enabled one skilled in the art to make and use the invention to the scope that it is presently claimed. As noted above, the Asahi Shinbum article relies upon Applicants article [Attachment 3]. Applicants’ view is further supported by the five affidavits of Mitzi [Attachment 16], Tsuei [Attachment 18], Dinger [Attachment 17], Shaw [Attachment 19] and Duncombe [Attachment 20] under 37 CFR 1.132 and the book of Poole [Attachment 21] which will be described below and which states that once it was known from Applicants article that transition metal oxides, were superconductive at temperatures above greater than or equal to 26°K, other high T_c materials, such as transition metal oxides, could be made by a person of skill in the art using the teaching of Applicants and the general teachings of ceramic science.

The Examiner further states in the final rejection of the parent application:

- ii. The Applicants quote several passages from their specification at pp. 13-15 of their September 29, 1995 Amendment, but the issue is the scope of enablement, not support. The present disclosure may or may not provide support for particular embodiments, but the issue here is the scope to which that disclosure would have taught one skilled in the art

how to make and use a composition which shows the onset of superconductivity at above 26°K.

Applicants are not required to provide experimental evidence for every species within the scope of their claims. The entire field of high T_c superconductivity is based on Applicants' work, in particular, on Applicants' article. This affidavit of James W. Leonard under 37 CFR 1.132 submitted on December 15, 1998 [Attachment 22] states that 5,689 articles cited Applicants' article (Z. FurPhys. B, 64, pp. 185-193 (September 1986) [Attachment 3]. This is clear evidence that Applicant article originated and enabled the field of high T_c superconductivity. It is clear by the facts presented by Applicants that they "have taught one of skill in the art how to make and use a composition which shows the onset of superconductivity at above 26°K". The Examiner has introduced no factual evidence to the contrary. The Examiner merely "deems" (that is, in his conclusory opinion) that Applicants' claims are not enabled.

The Examiner further states in the final rejection of the parent application:

- iii. Construed in light of that issue, the invention is not deemed to have been fully enabled by the disclosure to the extent presently claimed.

The Examiner again "deems" (that is, in his conclusory opinion) that Applicants claims not enabled without factual support.

The Examiner further states in the final rejection of the parent application:

(1) In their September 29, 1995 Amendment, the Applicants argue that their disclosure refers to "the composition represented by the formula RE-TM-O, where RE is a rare earth or rare earth-like element, TM is a nonmagnetic transition metal, and O is oxygen", and list several species such as "**La_{2-x}Ba_xCuO_{4-y}**" which they indicate are found in the present disclosure.

Applicants disagree. The passages quoted in the September 29, 1995 amendment lists numerous specific compositions and generic formula as indicated above. The listed species were preferred embodiments at the time of filing the present application. Preferred embodiments do not provide a limitation to the broad scope of Applicants teaching.

The Examiner further states in the final rejection of the parent application:

(2) Notwithstanding that argument, it still does not follow that the invention is fully enabled for the scope presently claimed. The claims include formulae which are much broader than the RE-TM-O formula cited in the disclosure. Claim 24 recites "a transition metal oxide", claim 88 "a composition", and claim 96 "a copper-oxide compound".

As noted above the specification at page 1, line 5-10, states "[t]his invention relates to ... superconducting compositions including copper and/or transition metals." And at

page 5, lines 5-9 "[i]t is [an] ... object of the present invention ... to provide novel superconductive compositions that are oxides."

The Examiner further states in the final rejection of the parent application:

(a) The present specification actually shows that known forms of "a transition metal oxide", "a composition", and "a copper-oxide compound" do not show the onset of superconductivity at above 26°K. At p. 3, line 20, through p. 4, line 9, of their disclosure, the Applicants state that the prior art includes a "Li-Ti-O system with superconducting onsets as high as 13.7°K. " Official Notice is taken of the well-known fact that Ti is a transition metal. That disclosure also refers to "a second, non-conducting CuO phase" at p. 14, line 18.

Applicants' claims are directed to an apparatus comprising "compositions", "transition metal oxides", "a composition" and "a copper-oxide compound" having a $T_c \geq 26^\circ\text{K}$ which is carrying a superconducting current. Applicants claims do not include in the claimed apparatus compositions having $T_c < 26^\circ\text{K}$. Thus the examples on page 3, line 20 - page 4, line 9, are not included in Applicants claims. That these are transition metal oxides having $T_c < 26^\circ\text{K}$ does not mean that Applicants' claims directed to transition metal oxides, compositions and copper oxides having $T_c \geq 26^\circ\text{K}$ are not enabled. Applicants provide the teaching on how to fabricate such compositions having $T_c \geq 26^\circ\text{K}$. The "second non-conducting CuO phase" referred to at page 14, line 18, again does not mean that Applicants claims are not enabled. Applicants statements at page 14 is part of Applicants teaching on how to achieve an oxide having a $T_c \geq 26^\circ\text{K}$.

The Examiner is attempting to use Applicants complete description of their teaching to show lack of enablement when, in fact, this complete teaching provides full enablement by showing how samples are and are not to be prepared. Applicants have claimed their invention functionally, that is, as an apparatus of use so the Applicants' claim do not read on inoperable species. What the Examiner "seems to be obsessed with is the thought of [compositions] which won't work to produce the intended result. Applicants have enabled those of skill in the art to see that this is a real possibility which is commendable frankness in a disclosure." In re Angstadt, Supra. Thus, the CCPA has found that the existence of compositions that do not work does not mean that the claimed inventions are not enabled.

The Examiner further states in the final rejection of the parent application:

(b) Accordingly, the present disclosure is not deemed to have been fully enabling with respect to the "transition metal oxide" of claim 24, the "composition" of claim 88, or the "copper-oxide compound" of claim 96.

Again without facts the Examiner "deems" (that is, the Examiner conclusorily asserts) Applicants' claims not enabled and for the reasons given above Applicants disagree. The only attempt at a factual support for the Examiner's statement are the examples provided by Applicants which show $T_c < 26^\circ\text{K}$. Applicants provide this teaching so that a person of skill in the art will be fully informed on how to practice Applicants invention.

The Examiner further states in the final rejection of the parent application:

(3) The examples at p. 18, lines 1-20, of the present specification further substantiates the finding that the invention is not fully enabled for the scope presently claimed.

(a) With a 1:1 ratio of (Ba, La) to Cu and an x value of 0.02, the La-Ba-Cu-O form (i.e., "RE-AE-TM-0", per p. 8, line 1) shows "no superconductivity".

This part of Applicants' teaching providing a complete teaching which permits a person of skill in the art to be fully enabled to practice Applicants' claimed invention. The issue according to In re Angstadt (referred to above) is whether Applicants have enabled those of skill in the art to practice Applicants invention without undue experimentation. That a person of skill in the art has to do experimentation to determine suitable combinations of elements to form a composition having $T_c > 26^\circ\text{K}$ through which a superconductive current flows is not an indication of a lack of enablement. Thus Applicants cited examples of compositions having $T_c < 26^\circ\text{K}$ does not show lack of enablement.

The Examiner further states in the final rejection of the parent application in regards to the examples at p. 18, lines 1-20:

(b) With a 2:1 ratio of (Ba, La) to Cu and an x value of 0.15, the La-Ba-Cu-O form shows an onset of superconductivity at " $T_c = 26^\circ\text{K}$ ". It should be noted, however, that all of the claims in this application require the critical temperature (T_c) to be "in excess of 26°K " or "greater than 26°K ".

Applicants do not believe that an onset of a T_c at 26°K is different than and greater than 26°K . Greater than 26°K can mean $T_c = 26^\circ\text{K}$ plus some infinitesimal temperature. To avoid this reason for rejection all claims in the present application, including added claims 232 to 321 have been amended to recite $T_c \geq 26^\circ\text{K}$.

The Examiner further states in the final rejection of the parent application:

(c) Consequently, the present disclosure is not deemed to adequately enable the full scope of the present claims. Independent claims 86 and 103 may require the presence of rare earth, alkaline earth, and transition metals, but the aforementioned examples show that superconductivity is still very unpredictable. Those claims cannot be deemed to be fully enabled.

The Examiner again "deems" claims 86 and 103 of the parent application, which correspond to claims 235 and 247 of the present application, as not fully enabled. This again is the Examiner's conclusory opinion. Claims 86 and 103 of the parent

application and corresponding claims 235 and 247 herein do not read on the examples cited in Applicants' specification which are superconductors having $T_c < 26^\circ\text{K}$. Thus these examples are not evidence that claims 86 and 103 of the parent application and claim 235 and 247 herein are not enabled. The examples are part of the teaching enabling a person of skill in the art to practice the invention of claims 86 and 103 of the parent application and claims 235 and 247 herein.

The Examiner further states in the final rejection of the parent application:

iv. The Applicants also have submitted [five] affidavits attesting to the Applicants' status as the discoverers of materials that superconduct $> 26^\circ\text{K}$. Each of the affidavits further states that "all the high temperature superconductors which have been developed based on the work of Bednorz and Muller behave in a similar manner (way)". Each of the affidavits add "(t)hat once a person of skill in the art knows of a specific transition metal oxide composition which is superconducting above 26°K , such a person of skill in the art, using the techniques described in the (present) application, which includes all known principles of ceramic fabrication, can make the transition metal oxide compositions encompassed by (the present) claims ... without undue experimentation or without requiring ingenuity beyond that expected of a person of skill in the art."

Applicants acknowledge that all five affiants are the employees of the assignee of the present application. (The affidavit of Shaw and Duncombe were submitted after the

date of the final rejection and were considered as indicated by the Advisory Action dated February 25, 1999 of the parent application).

The Examiner states in the final rejection of the parent application in response to the affidavits of Mitzi, Tsuei and Dinger:

- (1) Those affidavits do not set forth particular facts to support the conclusions that all superconductors based on the Applicants' work behave in the same way and that one skilled in the art can make those superconductors without undue experimentation. Conclusory statements in an affidavit or specification do not provide the factual evidence needed for patentability.

The Examiner cited *In re Lindner*, 173 USPQ 356, 358 (CCPA 1972) in support of this statement. In *In re Lindner* the patent applicant submitted Rule 132 affidavit based on one example to show unexpected results for a claim of broader scope. The CCPA held that "[i]t is well established that objective evidence of non-obviousness must be commensurate in scope with the claims." *In re Lindner* is not on point since it does not deal with the issue of enablement. A single example can enable a broader scope claim where nothing more is needed than what is taught by Applicants or what is taught by Applicants together with what is known by a person of skill in the art.

The affidavits of Mitzi, Tsuei, Dinger, Shaw and Duncombe are statements of experts in the ceramic arts. The Examiner disagrees with these experts. But the Examiner has

not submitted an Examiner's affidavit qualifying himself as an expert to rebut the statements of Applicants' affiants. Applicants re-request such an Examiner's affidavit.

The Examiner further states in the final rejection of the parent application:

(2) Those affidavits do not overcome the non-enablement rejection. The present specification discloses on its face that only certain oxide compositions of rare earth, alkaline earth, and transition metals made according to certain steps will superconduct at $>26^{\circ}\text{K}$.

Applicants disagree. The affidavits of Shaw [Attachment 19] and Duncombe [Attachment 20] cites numerous books and articles which provide the general teaching of ceramic science at the time of and prior to the filing date of the present application. The affidavit of Duncombe also provides several hundred pages copied from Mr. Duncombe's notebooks starting from before Applicants' filing date. In regards to these pages, Mr. Duncombe states "I have recorded research notes relating to superconductor oxide (perovskite) compounds in technical notebook IV with entries from November 12, 1987 to June 14, 1998 and in technical notebook V with entries continuing from June 7, 1988 to May 1989." Mr. Duncombe's affidavit list some of the compounds prepared using the general principles of ceramic science: $\text{Y}_1 \text{Ba}_2 \text{Cu}_3 \text{O}_x$, $\text{Y}_1 \text{Ba}_2 \text{Cu}_3 \text{O}_3$, $\text{Bi}_{2.15} \text{Sr}_{1.98} \text{Ca}_{1.7} \text{Cu}_2 \text{O}_{8+8}$, $\text{Ca}_{(2-x)} \text{Sr}_x \text{Cu O}_x$ and $\text{Bi}_2 \text{Sr}_2 \text{Cu O}_x$.

The Examiner further states in the final rejection of the parent application:

(3) Those affidavits are not deemed to shed light on the state of the art and enablement at the time the invention was made. One may know now of a material that superconducts at more than 26°K, but the affidavits do not establish the existence of that knowledge on the filing date for the present application. Even if the present application "includes all known principles of ceramic fabrication", those affidavits do not establish the level of skill in the ceramic art as of the filing date of that application.

The Examiner states that "these affidavits are not **deemed** to shed light on the state of the art and enablement at the time the invention was made," that is, it is the Examiner's conclusory opinion. Applicants disagree. The affidavits clearly state that all that is needed is Applicants' teaching and the ordinary skill of the art to practice Applicants claimed invention. Also, 35 USC §112, does not require that enablement be determined "at the time the invention was made". This language appears in 35 USC §103, but not in 35 USC §112. Thus it is clear that it was not the intent of Congress to determine enablement at the time the invention was made in the manner suggested by the Examiner. All that is necessary is "[t]he specification shall contain a written description ... to enable any person skilled in the art ... to make and use the same." Applicants initiated the field of high T_c superconductors. If a person of skill in the art from the description in Applicants' specification can practice Applicants' claimed invention, it is enabled. Applicants' are not required to show that a person of skill in the art had the knowledge prior to Applicants' invention. If this were the case Applicants would not be the first, sole and only inventors, since the invention would be known by others. Applicants teach ceramic processing methods to fabricate high T_c superconductors. This uses general principles of ceramic science known prior to the

filing date of the present application. Thus Applicants' claims are fully enabled. The Examiner has provided no evidence to the contrary. The Examiner has produced no evidence to demonstrate that a person of skill in the art, at the time of Applicants filing date, could not practice the claimed invention from Applicants teaching. The utilization of such teaching to practice Applicants' claimed invention was not known prior to Applicants' filing date. That is Applicants' discovery and thus why they are entitled to their claimed invention.

The Examiner further states in the final rejection of the parent application:

(4) It is fully understood that the Applicants are the pioneers in high temperature metal oxide superconductivity. The finding remains, nonetheless, that the disclosure, is not fully enabling for the scope of the present claims.

If Applicants pioneered the field of high T_c superconductivity, that is, they initiated the substantial worldwide effort to validate their discovery and to synthesize others specific embodiment of their generic and specific teaching, then Applicants should be entitled to generic claims since others based their work on Applicants' teaching.

The Examiner has cited the following seven decisions, which have been discussed in detail above, in support for the determination of non-enablement: In re Fisher, 166 USPQ 18, 24; and In re Angstadt and Griffen, 190 USPQ 214, 218. In re Colianni, 195 USPQ 150, 153, 154 (CCPA 1977). In re Cook, 169 USPQ 298, 302; and Cosden Oil

v. American Hoechst, 214 USPQ 244, 262. In re Corkill, 226 USPQ 105, 1009.

Brenner v. Manson, 383 US 519, 148 USPQ 689.

The Examiner has not applied the rational of these decisions. In fact, in the prosecution Applicant pointed out that the Examiner seems to have specifically avoided applying this case law and, consequently, Applicants take the Examiner's silence as concurrence in the manner that Applicants have applied this case law. In response to this the Examiner states in the final rejection of the parent application "[n]otwithstanding the Applicants' commentary on caselaw, the April 15, 1997 Office Action, paper no. 54, sets forth the factual basis for the determination of non-enablement at pp. 5-10." It is Applicants view that the Examiner is misapplying this case law.

In this regard the Examiner further states in the final rejection of the parent application:

(3) The Applicants still further argues "that the Examiner does not rebut the case law and argument provided by Applicants on (pages) 15-25 of their September 29, 1995 amendment which addresses (these issues) in detail." The point remains, nevertheless, that there appears to be a concurrence as to the applicable caselaw. That caselaw speaks for itself What has been fully addressed in the previous Office Action and repeated above is the factual basis for the determination of non-enablement for the scope of the present invention.

Case law does not speak for itself. The rule of a case depends on the facts of the case. The fact circumstances in the case must be compared with those of the present

application to justify application of the decision of the case. The Examiner has not done this. Applicants have shown above that the case law when properly applied support Applicants' position that their claims are enabled and does not support the Examiner's position that the non-allowed claims are not enabled.

The Examiner states in the final rejection of the parent application:

ii. The Applicants urge that "their disclosure supports a substantially broader scope than (particular) species." With respect to transition metals, the Applicants point to the support in their disclosure and argue that they were enabled for transition metals other than just copper. Again, however, it is noted that high temperature superconductivity is a highly unpredictable art. In view of the record as a whole, it is again determined that one skilled in the art would not have been enabled to practice the presently disclosed invention with transition metals other than copper."

The first paragraph of §112 requires nothing more than objective enablement , how such teaching is set forth , either by the use of illustrative examples or by broad terminology is of no importance" In re Marzochi, Supra. The Examiner has provided no factual evidence to support the Examiner's statement that the field of high T_c superconductivity is unpredictable. The Examiner has attempted to support this position based on Applicants' teaching. That teaching is part of Applicants' enabling disclosure. In the last sentence of the passage above the Examiner implies that Applicants claims directed to copper are enabled. Applicants teach transition metals. Copper is a transition metal. Applicants teaching enable persons of skill in the art to

make transition metal oxides which sustain a superconducting current at $T_c > 26^\circ\text{K}$.

The Examiner has provided no factual evidence that Applicants claims are not enabled for transition metals or any composition.

The Examiner states in the final rejection of the parent application:

iii. The Applicants argue that their own examples do not support the determination of non-enabling scope of the invention. Nevertheless, the record is viewed as a whole. If the Applicants could not show superconductivity with a $T_c > 26^\circ\text{K}$ for certain compositions falling within the scope of the present claims, it is unclear how someone else skilled in the art would have been enabled to do so at the time the invention was made.

The Examiner incorrectly states "Applicants could not show superconductivity with $T_c > 26^\circ\text{K}$ for certain compositions falling within the scope of the present claims." The claims of the parent application were directed to a method of flowing a superconducting current in a composition having a $T_c \geq 26^\circ\text{K}$. The corresponding claims herein are directed to an apparatus flowing a superconducting current in a composition having a $T_c \geq 26^\circ\text{K}$. If a composition has a $T_c < 26^\circ\text{K}$, a method or apparatus for flowing a superconducting current in such a compound cannot fall within the scope of Applicants' claims. Applicants are not claiming a composition of matter. They are claiming their discovery, passing a superconductive current through a composition, such as a

transition metal oxide having a $T_c \geq 26^\circ\text{K}$. No one prior to Applicants knew this. That is why they received the Nobel Prize in Physics in 1987.

The Examiner further states that Applicants' affidavits are conclusory. The Examiner appears to be placing himself up as an expert in the field of superconductivity.

Applicants requested that the Examiner submit an affidavit in the present application rebutting the position taken by Applicants' five affiants, but the Examiner has not submitted an affidavit. The facts are that the five affiants are experts in the art, the Examiner is not. The Examiner states that those "affidavits were insufficient because they were conclusory only, i.e., they lacked particular facts to support the conclusions reached". Applicants submitted the affidavit of Peter Duncombe [Attachment 20] which has provided hundreds of pages of notebook entries showing that he fabricated superconductive transition metal oxides according to the teaching of Applicants specification.

The Examiner has provided no substantial evidence to support this assertion of non-enabling scope of the invention. It is requested that the Examiner support his assertion with factual evidence or an Examiner's affidavit and not unsupported statements.

The Examiner is applying an incorrect standard of enablement. The Examiner is applying a standard applicable to composition of matter. Applicants are not claiming a composition of matter. As shown by Applicants prior comments Applicants have in fact

fully enabled the composition of matter. Therefore, Applicants have provided excess enablement for the claimed invention. The standard of enablement for a method of or an apparatus for use is not the same as the standard of enablement for a composition of a matter. Notwithstanding, it is well settled law that claims to a composition of matter can encompass a number of inoperable species. However, Applicants' claims do not cover any inoperable species. The claims only encompass apparatus for flowing a superconducting current in compositions that are superconducting at temperatures $\geq 26^{\circ}\text{K}$. Those compositions that are not superconducting at temperatures $\geq 26^{\circ}\text{K}$ are not encompassed by Applicants claims reciting these limitations. Applicants note that a claim to a composition of matter is dominant to any use of that composition of matter and claims directed to an apparatus for use of a composition of matter are necessarily of narrower scope than claims to the composition of matter. Applicants' claims do not encompass uses other than those which the claims are limited to by the use limitations recited in the claims. Applicants' claims are directed to what they have discovered. Therefore, Applicants' claims fully satisfy the requirements of 35 USC 112.

The claimed invention is enabled because it is directed to an apparatus use rather than a composition. Applicants are claiming their discovery, comprising an apparatus comprising a superconducting current in a composition with a $T_c \geq 26^{\circ}\text{K}$. If a patent applicant claims an apparatus for flowing current through a circuit having a resistive element, the applicant does not have to describe every method of making every type of resistive element for the claim to dominate all resistive elements. Such a claim reads on resistive elements made of materials not known at the time of filing since the

discovery is not the material but the apparatus for use. Applicants discovered that a superconducting current can be flowed in a composition having a $T_c \geq 26^\circ\text{K}$. That is what Applicants are claiming.

Process of use or apparatus for use claims are subject to the statutory provisions of 35 USC 112, first paragraph. All that is necessary to satisfy §112 is the statement that a superconducting current can be passed through a composition, such as a transition metal oxides having a $T_c \geq 26^\circ\text{K}$. The Examiner has essentially said this by rejecting Applicants non-allowed claims as anticipated under §102(a) or obvious under §103(a) in view of the Asahi Shinbum article [Attachment 6]. Applicants only allowed claim 136 of the parent application corresponding to claim 280 herein was allowed over the Asahi Shinbum article because it showed criticality for the formula recited in this claim. Since Applicants generic teaching does not prevent others from obtaining patents to specific formulas, Applicants are entitled to generic claims to their discovery. Applicants filed this application soon after their discovery. Applicants availed themselves of the one year grace period under 35 USC 102(b) by publishing their results before filing the present application. This was the quickest way to promote the progress of the field of high T_c superconductivity which can have substantial societal benefits such as less expensive electric power and more effective medical diagnostic tools. It is a policy of the United States Constitution, which establishes the United States Patent System, to encourage early disclosure of inventions to promote the progress of the useful arts. The Examiner's position that Applicants generic claims are not fully enabled frustrates this policy. Applicants could have decided not to publish Applicants' article and not to

file the present application while engaging in years of further experimentation to find all specific examples which had the optimal T_c . If Applicants acted this way, there would not have been the explosive worldwide effort to fully explore and implement high T_c transition metal oxide technology. The rationale used by the Examiner is contrary to the Constitutional policy to promote the progress of the useful arts by early disclosure of an invention. Early disclosure should not be a penalty to Applicants. Applicants are pioneers in discovering that compositions, such as, transition metal oxides, have $T_c \geq 26^\circ\text{K}$. A first discoverer of a wheel whose specific embodiment is a solid disc rotateable about an axle can claim a cylindrical member adapted for rotation about the axle and for rolling on a surface, that is, their discovery. This claim is dominant to a latter inventor's improved wheel comprising spokes which has the advantage of much lighter weight than a disc. The latter inventor is entitled to subservient claim to the dominant claim to a wheel. Applicants are entitled to a dominant claim to their discovery. The Examiner's rationale would preclude.

The Examiner has not shown by evidence not contained within Applicants' teaching that the art of high T_c superconductors is unpredictable. The Examiner has attempted to use Applicants' teaching to establish such unpredictability. The Examiner has essentially not responded to Applicants' comments. The Examiner has introduced no extrinsic evidence to support the Examiner's opinion that the field of high T_c superconductivity is unpredictable. The Examiner has not introduced an affidavit qualifying himself to offer such an opinion. The Examiner merely states that his opinion is supported by the record as a whole. The only thing that Examiner relies on is some

examples referred to above which do not have $T_c \geq 26^\circ\text{K}$ which as stated above is part of Applicants' enabling disclosure.

In response to the resubmitted 1.132 Affidavits of Mitzi [Attachment 16], Tsuei [Attachment 18] and Dinger [Attachment 17] (filed 12/16/98) and the newly provided 1.132 Affidavits of Thomas Shaw [Attachment 19] (filed 12/16/98) and Peter Duncombe [Attachment 20] (filed 12/21/98) the Examiner states in the final rejection of the parent application:

The Examiner notes the books describing the general principles of ceramic fabrication provided in these Affidavits. Also, the examiner notes that such fabrication techniques were utilized subsequently (after the filing date of the instant application) to produce the superconductive materials described in the Poole et al reference as well as the materials produced by Peter Duncombe (see Affidavit filed 12/21/98).

The affidavit of Peter Duncombe [Attachment 20] provides notebook entries beginning November 12, 1987, which is prior to Applicants filing date and prior to the Asahi Shinbum article. Duncombe used the general principles of ceramic science to implement the invention described in Applicants article [Attachment 3]. Each of the five affiants Tsuei [Attachment 18], Mitzi [Attachment 16], Duncombe [Attachment 20], Shaw [Attachment 19] and Dinger [Attachment 17] are experts in the field of ceramics. Each has stated the Applicants' claimed invention can be implemented based on

Applicants teaching and with nothing more than the general principles of ceramic science known at the time of filing of the present application.

The Examiner states in the final rejection of the parent application:

It is the examiner's maintained position that while general principles of ceramic fabrication were most certainly known prior to the filing date of the instant application, the utilization of such techniques to produce superconductive materials within the scope of the instant claims were not known. The affidavits are not effective to demonstrate enablement at the time of the invention was made. As stated in paper #66, page 8, one may now know of a material that superconduct at more than 26K, but the affidavits do not establish the existence of that knowledge on the filing date of the present application.

The Examiner acknowledges that the fabrication techniques necessary to practice Applicants' invention were known prior to the filing dated of the present application. But the Examiner further states that the "utilization of such techniques to produce superconductive materials within the scope of the instant claims were not known". The scope of the instant claim is an apparatus for flowing a superconductive current in a transition metal oxide having a $T_c \geq 26^\circ\text{K}$. That is Applicants' discovery. That is why it was not known prior to Applicants' discovery. How to make this type of material was known. Prior to Applicants' discovery, It was not known that they were superconductive with a $T_c \geq 26^\circ\text{K}$. The Examiner incorrectly states "one may now learn of a material that

superconducts at more than 26°K, but the affidavits do not establish the existence of that knowledge on the filing date of the present invention.” If that knowledge was known by another prior to the filing date, Applicants would not have a patentable invention since they would not be the initial first and sole inventor. The affidavits state that the knowledge of how to make compositions within the scope of Applicants’ claims, such as transition metal oxides, by the general principles of ceramic science were known prior to the filing date. In particular, the affidavits of Duncombe [Attachment 20] and Shaw [Attachment 19] refer to a number of articles and texts on the general principles of ceramic science. One of these texts is “Structures, Properties and Preparation of Perovskite-type Compounds”, F.S. Galasso (1969).

Applicants note that the book “Copper Oxide Superconductors” by Charles P. Poole, Jr., Timir Datta and Horacio A. Farach, John Wiley & Sons (1998) [Attachment 21] support their position that high temperature superconductors were not difficult to make after their original discovery. This book shall be referred to herein as Poole et al. or the Poole book . The Poole book was published after Applicants’ initial discovery which was published in Applicants’ article. The Examiner states “[a]s such, it does not, provide evidence of the state of the art at the time the presently claimed invention was made”.

Applicants disagree. The preface of this book says “[t]his volume reviews the experimental aspects of the field of oxide superconductivity with transition temperatures from 30K to above 123K, from the time of its discovery by Bednorz and Muller in April,

1986 until a few months after the award of the Nobel Prize to them in October, 1987.” Thus the book reports on work done within eighteen months of Applicants’ discovery in April 1986 and within eleven months of its publication in September, 1986. In the present application was filed on May 22, 1987. This passage is referring to Applicants and Applicants’ article [Attachment 3] referred to at page 6 of Applicants’ specification. This book acknowledges that Applicants are the discoverers of the field of high temperature superconductivity. (See Attachment A of Applicants’ response dated May 14, 1998 [Attachment 23] and See Attachment H of Applicants’ response dated November 28, 1997 [Attachment 24]). The Examiner’s view that the skill of the art was insufficient at the time of the filing date of the present application is untenable in the view of Poole et al. and Applicants’ 132 affidavits of Tsuei [Attachment 18], Mitzi [Attachment 16], Shaw [Attachment 19], Dinger [Attachment 17] and Duncombe [Attachment 20], in particular that of Peter Duncombe which reports data prior to the Applicants’ filing date.

Applicants note that it is generally recognized that it is not difficult to fabricate transition metal oxides and in particular copper metal oxides that are superconductive after the discovery by Applicants of composition, such as transition metal oxides, are high T_c superconductors. Chapter 5 of the Poole et al. [Attachment 21] book entitled “Preparation and Characterization of Samples” states at page 59 “[c]opper oxide superconductors with a purity sufficient to exhibit zero resistivity or to demonstrate levitation (Early) are not difficult to synthesize. We believe that this is at least partially responsible for the explosive worldwide growth in these materials”. Poole et al. further

states at page 61 "[i]n this section three methods of preparation will be described, namely, the solid state, the coprecipitation, and the sol-gel techniques (Hatfi). The widely used solid-state technique permits off-the-shelf chemicals to be directly calcined into superconductors, and it requires little familiarity with the subtle physicochemical process involved in the transformation of a mixture of compounds into a superconductor." Poole et al. further states at pages 61-62 "[i]n the solid state reaction technique one starts with oxygen-rich compounds of the desired components such as oxides, nitrates or carbonates of Ba, Bi, La, Sr, Ti, Y or other elements. ... These compounds are mixed in the desired atomic ratios and ground to a fine powder to facilitate the calcination process. Then these room-temperature-stable salts are reacted by calcination for an extended period (~20hr) at elevated temperatures (~900°C). This process may be repeated several times, with pulverizing and mixing of the partially calcined material at each step." This is generally the same as the specific examples provided by Applicants and as generally described at pages 8, line 19, to page 9, line 5, of Applicants' specification which states "[t]he methods by which these superconductive compositions can be made can use known principals of ceramic fabrication, including the mixing of powders containing the rare earth or rare earth-like, alkaline earth, and transition metal elements, coprecipitation of these materials, and heating steps in oxygen or air. A particularly suitable superconducting material in accordance with this invention is one containing copper as the transition metal." (See Attachment A of Applicants' response dated May 14, 1998 [Attachment 23] and See Attachment H of Applicants' response dated November 28, 1997 [Attachment 24]).

Consequently, Applicants have fully enabled high T_c transition metal oxides and their claims.

As stated in the affidavit of Dr. Mitzi [Attachment 16], Dr. Dinger [Attachment 17], Dr. Tsuei [Attachment 18], Dr. Shaw [Attachment 19] and Mr. Doncombe [Attachment 20] the preface of the book by Poole et al., quoted above, the work of Applicants initiated the field of high temperature superconductors and these materials are not difficult to synthesize. And according In re Fisher "it is apparent that such an inventor should be allowed to dominate future patentable inventions of others where those inventions were based in some way on his teaching." (166 USPQ 18, 24)

The Examiner further states in the final rejection of the parent application:

Moreover, the present claims are directed to processes of using metal oxide superconductors, not processes of making them. Even if the Poole article provided direct evidence of the state of the art at the time the invention was made, which it apparently does not, that evidence still does not pertain to the issue at hand, namely, the process of using metal oxide superconductors to conduct electricity under superconducting conditions.

Applicants disagree. Poole et al. [Attachment 21] Chapter X entitled "Transport Properties" describes a process of using metal oxides superconductors to conduct electricity under superconducting conditions. Section B of Chapter X is entitled "Current Flow". A copy of Chapter X is in Attachment 40 of this paper.

The Examiner further states in the final rejection of the parent application in regard to Poole et al. [Attachment 21]:

(3) Finally, the Preface states in part at A3: "The unprecedented worldwide effort in superconductivity research that has taken place over the past two years has produced an enormous amount of experimental data on the properties of the copper oxide type materials that exhibit superconductivity above the temperature of liquid nitrogen. ... During this period a consistent experimental description of many of the properties of the principal superconducting compounds such as BiSrCaCuO, LaSrCuO, TlBaCaCuO, and YBaCuO has emerged. ... The field of high-temperature superconductivity is still evolving ..." That preface is deemed to show that the field of high-temperature superconductivity continued to grow, on the basis of on-going basic research, after the Bednorz and Meuller article was published.

The continued growth referred to in the passage from Poole et al. [Attachment 21] quoted above does not mean that this work is not based on Applicants' initial fundamental teaching. Poole et al. as quoted above states that the unprecedented amount of work done in the short period of time after Applicants' work was because the materials "are not difficult to synthesize." Moreover, as quoted above the CCPA In re Fisher states "such an inventor should be allowed to dominate future patentable inventions of other where those inventors were based on in some way on his teachings." Moreover, the referred to future developments in the passage above are not necessarily patentably distinct from Applicants' teachings. Those who developed

these compounds would have a reasonable expectation of success based on Applicants' teaching. The Examiner has provided no evidence to the contrary.

The Examiner acknowledges that the three affidavits of Dr. Tsuei [Attachment 18], Dr. Dinger [Attachment 17] and Dr. Mitzi [Attachment 16] which were signed in May of 1998 states that the present application "includes all known principles of ceramic fabrication known at the time the application was filed." However, the Examiner further in the final rejection of the parent application states that the "additional indication also is considered to be a conclusory statement unsupported by particular evidence". The advisory action dated February 25, 1998 acknowledges the revised 1.132 affidavits of Mitzi [Attachment 16], Tsuei [Attachment 18] and Dinger [Attachment 17] (filed 12/16/98) and the newly provided affidavit of Shaw [Attachment 19] (filed 12/16/98) and Dumcombe [Attachment 20] (filed 12/21/98). These revised and additional affidavits cite numerous articles and books, all published before the Applicants' filing date, which provide evidence of the general teaching of ceramic science, and in particular, ceramic fabrication techniques for transition metal oxides, more particularly for Perovskites and most particularly for the type of Perovskites of Applicants' preferred embodiments. Applicants disagree that their affidavits are conclusory. The facts are provided by Poole et al. [Attachment 21]. The affidavits corroborate what Poole et al. [Attachment 21] states.

In view of these arguments all the added claims are enabled under 35 USC 112, first paragraph, and withdrawal of rejected claims are respectfully requested.

REJECTIONS UNDER 35 USC 112, SECOND PARAGRAPH

Claims 86-87, 96-108, 115, 118, 120, 122, 123, 129-135, and 137-142 of the parent application were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. These claims correspond to added claims.

In paragraph 6-7 on page 12-16 of the final rejection of the parent application, Claims 86-87, 96-108, 115, 118, 120, 122, 123, 129-135 and 137-142 were rejected under 35 USC 112. The Examiner finds the terms "layer-like", "perovskite-like", "rare-earth-like", and "layer-type" indefinite. These terms occur in claims 86-87, 96-108, 112, 113, 117, 118, 122 and 123 of the parent application in added corresponding claims 235, 236, 240-252, 256, 257, 261, 262, 266 and 268 of the present application. As stated by the Applicants in the prosecution these are terms of art and well understood by persons of skill in the art.

The Examiner states in the final rejection of the parent application:

- a. With respect to claims 86-87 and 96-108, the terms "layer-type", "perovskite-like", "rare-earth-like" are vague and confusing.
- i. The question arises: What is meant by these terms?

(1) The terms "layer-type" and "perovskite-like" are unclear because the "type" or "like" terms are deemed to be indefinite. Terms such as "like", "similar", and "type" are indefinite." It is suggested that "layer-type perovskite-like crystal structure" be changed -- a substantially layered perovskite crystal structure --.

In support of the Examiner's view of term such as "type" and "like", the Examiner cites: Ex parte Remark, 15 USPQ 2d 1498, 1500 (BPAI 1990); Ex parte Kristensen, 10 USPQ 2d 1701, 1703 (BPAI 1989); Ex parte Attig, 7 USPQ 2d 1092, 1093 (BPAI 1988); and Ex parte Copenhaver, 109 USPQ 118 (POBA 1955).

Ex parte Remark is not on point since the Board found the term "and the like" in a claim to be indefinite under §112. Applicants claims do not use this terminology.

Ex parte Kristensen is not on point since the Board found the term "similar" in the phrase "for high pressure cleaning units or similar apparatus" in a claim indefinite under §112, second paragraph. Applicants do not use the terminology "or similar". The Board held with respect to the second paragraph of §112, the inquiry is "to determine whether the claims do, in fact, set out and circumscribe a particular area with a reasonable degree of precision and particularity". In the present application the terms "perovskite-like", "perovskite-type", "layered-like", "layered-type" and "rare-earth-like" are terms used in the art and these are well known and understood by a person of skill in the art. Thus the present specification satisfies the Ex parte Kristensen standard.

Ex parte Attig is also not on point. The Board found the term "ZSM-5-type" indefinite under §112, second paragraph, because the prior art cited during prosecution gave different meanings to the term "ZSM-5-type". But the Board did not find the use of the term "type" in a claim per se indefinite. The Board says "[i]t is true that the zeolites have been defined in various patents and claimed with the terminology "ZSM-5-type". However, clearly the art of record in this case, all of it cited by Applicants themselves, in the aggregate serve to render the term indefinite rather than definite". 7 USPQ 1092, 1093. The Examiner has not shown that the terms "perovskite-like", "perovskite-type", "layered-like", "layered-type" and "rare-earth-like" as used in Applicants claims have different meanings in different cited prior art. To the contrary, Applicants have shown that these terms have a uniform meaning in the high T_c art.

In Ex parte Copenhaver, the Board stated in regard to the terminology "Friedel-Graftz type" catalyst.

"[w]e are of the view that the word "type" when appended to another wise definite expression so extends the scope of such an expression as to render it objectionably indefinite from the stand point of patent law and procedures.

We are not led to a different conclusion by the fact that the expression may have been used in certain technical and scientific publications which are not subject to the rigid legal requirements for definitions that apply to patent claims. The fact that the expression may have been used in claims of certain patents likewise does not alter our view on the question."

Applicants note that Ex parte Copenhaver decided in 1955 was not cited by the Board in the later Board decisions cited by the Examiner. This decision has not been cited by any other Board or Court decision.

The Examiner states that the term "rare earth-like element" is indefinite and that the terms "type and "like" are unclear. Applicants respectfully disagree. Attachment A of Applicants' response dated November 28, 1997 [Attachment 25] is the result of a Lexis search done by the undersigned attorney. This search shows the term "rare earth like" or "rare earth and the like" used in 68 US patents. The sections of the 68 patents where these terms appears are printed using the "KWICK" function of Lexis.

Attachment B of Applicants' response dated November 28, 1997 [Attachment 26] is the results of a Lexis search done by the undersigned attorney. This search shows the term "rare earth like" used in the claims of 4 issued US patents. The sections of the claims of the 4 patents where this term appears in the claims are printed using the "KWICK" function of Lexis. Consequently, the term "rare earth like" is a term use in the art, understood by a person of skill in the art and recognized as a definite term by the USPTO for use in US patent claims.

The Examiner states that the term "perovskite-like" is indefinite. The term "perovskite-like" or "perovskite-type" is commonly used in the art. Attachment C of Applicants' response dated November 28, 1997 [Attachment 27] is the results of a Lexis search done by the undersigned attorney. This search shows that the terms "perovskite like" and "supercond!" (the "!" represents any combination of letters) are used in 107 US

patents. The section of the 107 patents where these terms appears are printed using the "KWICK" function of Lexis. Attachment D of Applicants' response dated November 28, 1997 [Attachment 28] is a result of a Lexis search done by the undersigned attorney. This search shows the terms "perovskite like" or 'perovskite type' used in the claims of two issued US patents. The sections of the claims of the 2 patents where this term appears in the claims are printed using the "KWICK" function of Lexis. Attachment E of Applicants' response dated November 28, 1997 [Attachment 29] is a copy of the first page of Chapter 2 of the book "Perovskites and High T_c Superconductors" by F. S. Galasso, Gordon and Breach Scientific Publishers, 1990. Chapter 2 is entitled "Structure of Perovskite-type Compounds". Attachment F of Applicants' response dated November 28, 1997 [Attachment 30] is a copy of page 78 of the book by C. Poole, Jr. et al. Page 78 is the beginning of the section entitled "D. Perovskite-type Superconducting Structures". The first paragraph of the section states "[i]n their first report on high-temperature superconductors Bednorz and Muller [the Applicants] referred to their samples as 'metallic, oxygen deficient ... perovskite like mixed valent copper compounds.' Subsequent work has confirmed that the new superconductors do indeed have these characteristics. In this section we will comment on their perovskite-like aspects" (insert added). Consequently, the terms "perovskite like" or "perovskite type" are terms used in the art and recognized as a definite by the USPTO for use in US patent claims. (It is noted that this passage also shows that the terminology "mixed valent copper compounds" is used and understood in the art. Applicant further notes that one of the books cited in the affidavit of Peter Duncombe [Attachment 20] to demonstrate the general teaching of ceramic science includes in the

title "Perovskite-Type Compounds". This book was published in 1969 showing that this term was well known and understood by those of the skill in the art long before the filing date of the present application.

The Poole et al. in Chapter VI on "Crystallographic Structures" [Attachment 21] states at page 73 "[m]uch has been said about the oxide superconductor compounds being **perovskite types**, so we will begin with a description of the perovskite structure." (emphasis added) (See Attachment I of Applicants response dated November 28, 1997 [Attachment 31]). Thus, the Poole book uses the term "perovskite type" and explains its meaning.

The undersigned attorney did a search in Lexis for the terms "like" in issued US patents. As shown in Attachment A of Applicants' response dated December 27, 1997 [Attachment 32], this search Lexis found 140,058 issued US patents using the terminology "like" in the claims. The USPTO has, therefore, accepted this terminology as definite within the meaning of 35 USC 112. A number of specific examples are provided in Attachments B of Applicants' response dated December 27, 1997 [Attachment 33], to Attachment J of Applicants' response dated December 27, 1997, each of which are the results of a similar Lexis search. (Lists of the patent numbers will be provided at the request of the Board.) Attachment B [Attachment 33] shows that there are 443 issued US patents having the term "diamond like" in the claims. Attachment C [Attachment 33] of Applicants' response dated December 27, 1997, shows that there are 319 issued US patents having the term "diamond like carbon" in

the claims. Attachment D [Attachment 33] of Applicants' response dated December 27, 1997, shows that there are 10 issued US patents having the term "halogen like" in the claims. Attachment E [Attachment 33] of Applicants' response dated December 27, 1997, shows that there are 11 issued US patents having the term "oxygen like" in the claims. Attachment F [Attachment 33] of Applicants' response dated December 27, 1997, shows that there are 79 issued US patents having the term "ceramic like" in the claims. Attachment G [Attachment 33] of Applicants' response dated December 27, 1997, shows that there are 31 issued US patents having the term "carbon like" in the claims. Attachment H [Attachment 33] of Applicants' response dated December 27, 1997, shows that there are 5 issued US patents having the term "silicon like" in the claims. Attachment I [Attachment 33] of Applicants' response dated December 27, 1997, shows that there are 10 issued US patents having the term "nitrogen like" in the claims. Attachment J [Attachment 33] of Applicants' response dated December 27, 1997, shows that there are 17 issued US patents having the term "copper like" in the claims. In view thereof Applicants respectfully submit that the terminology "layer-like", "perovskite like" and "rare-earth-like" are definite since use of the term "like" is recognized as definite under 35 USC 112 by the USPTO.

Also the term "ceramic-like" is a term commonly used in the art. Attachment M of Applicants' response dated November 28, 1997 [Attachment 34] is the result of a Lexis search performed by the undersigned attorney using the search criteria "ceramic" with one word of "like" and "copper" within one word of "oxide" and "rare" within one word of "earth". This search identified 23 issued US patents. These patents are listed in the

attachment using the Lexis KWICK feature which list only those portions of the patents where these terms appear. The search was limited to this criteria since a search on "ceramic" within one word of "like" identified more than 1,000 issued US patents and a search on "ceramic" within one word of "like: in the same document as "copper" within one word of "oxide" identified more than 1000 US patents. It is clear that the term "ceramic like" is well understood in the art and is thus definite.

An affidavit under 37 CFR 1.132 of Dr. James W. Leonard, IBM research librarian was submitted on December 15, 1998 [Attachment 22]. Dr. Leonard did a search of articles referencing Applicants article J. G. Bednorz and K. A. Muller, Zeitschrift fur Physik B-Condensed Matter, **64** , pp. 189-193 (Sept. 1986) [Attachment 3] which is incorporated by reference in the specification at page 6, lines 8-10. As stated at page 6 this article is the basis for Applicants invention. More than 5800 articles have referenced Applicants' article. This is evidence that Applicants' teaching in the present application has motivated persons of skill in the art to work in the field of high T_c superconductivity and that Applicants teaching has fully enabled the invention of their claims. All these articles citing Applicants' article acknowledge that their work is based on Applicants' teaching.

Claims 112, 113, 117, 118, 122 and 123 of the parent application were rejected under 35 USC 112 as indefinite for using terminology "layer-type". These claims correspond to added claims 256, 257, 261, 262, 266 and 267 herein. Applicants respectfully disagree.

The undersigned attorney did a search in Lexis for the terms "layer-type" and the term "layer" preceding the term "type" by one word (layer pre/1 type). In this search Lexis found 225 issued US patents using this terminology in the claims. The USPTO has, therefore, accepted this terminology as definite within the meaning of 35 USC 112. Attachment A of the Applicants' response dated December 22, 1998 [Attachment 35], is the results of this search printed out using the .kw or "kwick" feature which prints the searched term and words before and after the searched term. The searched terminology appears in a number of forms such as "layer type", "layer-type", "layer of type". In view thereof Applicants request the Examiner to withdraw the rejection of claims 112, 113, 117, 118, 122 and 123 under 35 USC 112 as indefinite for using the terminology "layer-type".

In attachment B of the Applicants' response dated December 22, 1998 [Attachment 36], there is a search done by Jim Leonard, an IBM Research librarian, at the request of the undersigned attorney of the term "Layered like" and "layered type" in on-line non-patent literature prior to Applicants' filing date. From Attachment B of the Applicants' response dated December 22, 1998 [Attachment 36], it is clear that these terms are used and understood by persons of skill in the art.

In attachment C of the Applicants' response dated December 22, 1998 [Attachment 37], there is a search done by Jim Leonard, an IBM Research librarian, at the request of the undersigned attorney of the term "rare earth like" in on-line non-patent literature prior to Applicants' filing date. From this Attachment C it is clear that this term is used and

understood by persons of skill in the art. This is in addition to the other evidence of the definiteness of this term to overcome the rejection of Applicants' claims as indefinite for using the term "rare earth like" which Applicants respectfully request the Board to reverse.

In Attachment D of the Applicants' response dated December 22, 1998 [Attachment 38], there is a search done by Jim Leonard, an IBM Research librarian, at the request of the undersigned attorney of the term "perovskite like" in on-line non-patent literature prior to Applicants' filing date. From this Attachment D it is clear that this term is used and understood by persons of skill in the art. This is in addition to the other evidence of the definiteness of this term to overcome the rejection of Applicants' claims as indefinite for using the term "perovskite like" which Applicants respectfully request the Board to reverse.

The Examiner Further states in the final rejection of the parent application:

(1) The terms "layer-type" and "perovskite-like" are unclear because the "type" or "like" terms are deemed to be indefinite. Terms such as "like", "similar", and "type" are indefinite." It is suggested that "layer-type perovskite-like crystal structure" be changed -- a substantially layered perovskite crystal structure --.

Applicants have said that person of skill in the art would understand (rare earth-like) to mean that a location occupied by a rare earth element can also be occupied by another element which would have chemical properties similar enough to the rare earth

elements such that it would fit in to the lattice site occupied by the rare earth element and act chemically as a rare earth element. To this the Examiner has responded "[t]hat response does not alleviate the problem, however. Other elements may 'fit' into the lattice but they may not necessarily be 'rare-earth-like'". This comment does not address the issue. There are only about 100 elements of which 14 or 15 are rare-earth elements leaving about 86 other elements. It is not difficult for a person of skill in the art to determine which elements will behave like a rare-earth element when placed in the lattice.

Claims 112, 113, 115, 117, 118, 120, 122, and 123 of the parent application were found to be indefinite for the reasons that follow. Corresponding claims herein are 256, 257, 261, 262, 264, 266 and 267.

- i. In claim 112, line 5, has the terms "layer-type" and "perovskite-like", both of which are indefinite.
- ii. In claim 113, line 5, has the terms "layer-type" and "perovskite-like", both of which are indefinite.
- iv. In claim 117, line 5, has the terms "layer-type" and "perovskite-like", both of which are indefinite.
- v. In claim 118, line 5, has the terms "layer-type" and "perovskite-like", both of which are indefinite.
- viii. In claim 122, line 5, has the terms "layer-type" and "perovskite-like", both of which are indefinite.

ix. In claim 123, line 5, has the terms "layer-type" and "perovskite-like", both of which are indefinite.

d. Applicants' arguments filed March 7, 1997 (#59) have been fully considered but they are not persuasive.

These issues have been addressed above.

Applicants have cited numerous issued U.S. patents using "type" and "like" in the claims. Many of these patents used the identical terminology objected to by the Examiner which has been used by Applicants. Many issued U.S. patents similar terminology to that used by Applicants. The Examiner has provided no reason for rejecting Applicants claims using the terminology "layer-type", "perovskite like", "perovskite type" and "rare earth like" under §112, second paragraph as indefinite when there are issued patents using these and related terms in the claims.

In view of these arguments Applicants request withdrawal of the rejections of claims using this terminology as being indefinite under 35 U.S.C. § 112, second paragraph.

**ARGUMENTS IN RESPONSE TO THE EXAMINER'S ANSWER
IN THE PARENT APPLICATION**

In the parent application, Applicants submitted an appeal brief to which the Examiner responded with an Answer.

In the answer of the parent application the Examiner states:

In the answer at section (10) "Grounds of Rejection" the Examiner states:

The following ground(s) of rejection are applicable to the appealed claims:

The specification is objected to under 35 U.S.C. § 112, first paragraph, as failing to provide an enabling disclosure commensurate with the scope of the claims.

The present specification is deemed to be enabled only for compositions comprising a transition metal oxide containing at least a) an alkaline earth element and b) a rare-earth element or Group III B element.

Note that the above 112, first paragraph, rejection has been modified in scope from the Final Office Action. Upon careful consideration of the evidence as a whole, including the specification teachings and examples, and applicant's affidavits and remarks, **the Examiner has determined that the instant specification is enabled for compositions comprising a transition metal oxide containing an alkaline earth element and a rare-earth or Group IIIB element (as opposed to only compositions comprising $\text{BaLa}_{5-x}\text{Cu}_5\text{O}_y$ as stated in the Final Office action).**

Applicant has provided guidance throughout the instant specification that various compounds, such as transition metal oxides (such as copper oxide) containing an alkaline earth element and a rare earth or Group IIIB element result in superconductive compounds which may in turn be utilized in the instantly claimed methods.

Applicants disagree that they have only enabled compositions containing an alkaline earth element and a rare earth or Group IIIB element to result in superconductive compounds which may in turn be utilized in the method claims of the parent application 132, 133, 136-138, 143, 144, 146, 148, 152-157, 160-163, 167-168, 171-173, which correspond to 258-260, 263-265 and 268-270 herein. Applicants respectfully disagree with the Examiner. There are numerous examples of high T_c superconductors made using the general principals of ceramic science as taught by Applicants that existed prior to Applicants' earliest filing date. The affidavit of Duncombe [Attachment 20] submitted by Applicants specifically recites some of the compounds reported on in the several hundred pages included from his lab note books which include: $Y_1 Ba_2 Cu_3 O_x$, $Y_1; Ba_2 Cu_3 O_3$; $Bi_{2.15} Sr_{1.98} Ca_{1.7} Cu_2 O_{6+8}$; $Ca_{(2-x)} Sr_x Cu O_x$ and $Bi_2 Sr_2 Cu O_x$. Even though the last three compounds are made according to Applicants' teaching they do not come within the scope of the claims allowed by the Examiner in the answer of the parent application since they do not include a rare earth or a group IIIB element. Moreover, in the answer the Examiner quotes from the preface of the Poole article [Attachment 21] which states in part at A3: "The unprecedented worldwide effort in superconductivity research that has taken place over the past two years has produced an enormous amount of experimental data on the properties of the copper oxide type materials that

exhibit superconductivity above the temperature of liquid nitrogen. ... During this period a consistent experimental description of many of the properties of the principal superconducting compounds such as BiSrCaCuO, LaSrCuO, TlBaCaCuO. and YBaCuO has emerged". The first and third of these compositions does not come within the scope of the claims allowed by the Examiner in the answer of the parent application even though Poole states that they are easy to make following the general principals of ceramic science as taught by Applicants. Other data supporting Applicants' view is reported in the Review Article "Synthesis of Cuprate Superconductors" by Rao et al., IOP Publishing Ltd. 1993. A copy of this article is in Attachment 44 of this response. This article lists in Table 1 the properties of 29 cuprate superconductors made according to Applicants' teaching. Twelve (#'s 1, 8-13, 16, 17, 20, 21, 27 and 28) of those listed do not come within the scope of the claims allowed by the Examiner. Only three of the 29 have a $T_c < 26^\circ\text{K}$. Those twelve do not contain one or more of a rare earth, a group IIIB element or an alkaline earth element. It is thus clear that claims of broader scope than allowed in the answer of the parent application should be allowed since it is clear that the allowed claims can be avoided following Applicants' teaching without undue experimentation.

At page 21 of the answer of the parent application, the Examiner comments in regard to the claims rejected under 35 USC 112, second paragraph, the Examiner states that "[n]ote the Examiner declines to comment on Applicants' remarks regarding the after-final submissions which have not been entered or considered by the Examiner." These after final submissions of the parent application have been submitted in the

present application. These unentered after final submissions provide evidence that the terminology "perovskite-like", perovskite-type", and "rare-earth-like" were understood by persons of skill in the art prior to Applicants' filing date. This evidence is in addition to evidence previously submitted to show that these terms were well understood in the art. Thus this new evidence is not directed to any new issues but is additional evidence on the same issue. Some of the additional evidence is issued US patents having claims containing the identical terminology which the Examiner finds indefinite. Other evidence is issued US patents using similar terminology in issued claims indicates that the use of such terminology in US patent claims is standard USPTO practice.

SUMMARY OF ARGUMENT IN REPLY
THE EXAMINER'S ANSWER IN THE PARENT

***THE EXAMINER HAS NOT REBUTTED APPELLANTS'
CLAIM OF PRIORITY IN THE ANSWER IN THE PARENT APPLICATION***

In the answer of the parent application the Examiner has not rebutted Applicants' arguments in support of their claim of priority. Therefore, Applicants request the grant of Applicants' claim of priority.

***REJECTIONS UNDER 35 USC 102 AND 103 NECESSARILY
REQUIRES THAT ALL CLAIMS ARE FULLY ENABLED***

In the answer of the parent application the Examiner has withdrawn the rejections under 35 USC 102 and 103 over the Asahi Shinbum article since Applicants have shown that they conceived prior to the date of this article and were diligent to a reduction to practice. The Examiner has not commented on nor rebutted Applicants' argument that in rejecting claims under 35 USC 102 and 103 over the Asahi Shinbum article [Attachment 6], the Examiner necessarily concludes that Applicants' claims are fully enabled. The Asahi Shinbum article refers to Applicants' work which was reported in their original article which is incorporated by reference in Applicants' specification. Since Applicants' original article is the only information enabling the Asahi Shinbum article, it logically follows that the Examiner necessarily concludes that all Applicants' claims are fully enabled.

**OBJECTION TO SPECIFICATION AND REJECTION OF CLAIMS
UNDER 35 USC 112, FIRST PARAGRAPH
THE EXAMINER HAS FAILED TO MEET HIS BURDEN OF PROOF**

The only support for the objection to the specification and rejection of claims as not enabled under 35 USC 112, first paragraph, is the Examiner's unsupported statement that the field of high T_c superconductivity is unpredictable, the Examiner's unsupported statement that the theoretical mechanism of superconductivity in these materials was not well understood, and two examples in Applicants' specification that show metal oxides having a $T_c < 26^\circ\text{K}$. The Examiner provides no extrinsic evidence to support the Examiner's position of nonenablement. Applicants have submitted five affidavits of experts rebutting the Examiner's position of nonenablement, the article by Rao et al. [Attachment 44] and the book by Poole et al. [Attachment 21] which clearly states that it is easy to fabricate high T_c materials. Moreover, the book by Poole [Attachment 21], the Affidavit of Duncombe [Attachment 20] and the article by Rao [Attachment 44] shows numerous examples of high T_c compositions fabricated according to Applicants' teaching which do not fall within the scope of the claims allowed by the Examiner in the answer of the parent application and the corresponding added claims herein, but do fall within the scope of the claims which have not been allowed by the Examiner in the answer to the parent application and the corresponding added claims added herein. The Examiner has not rebutted Applicants' application of case law which holds that 35 USC 112, first paragraph, permits claims to read on inoperable species. Notwithstanding, Applicant's claims do not read on any inoperative species. Under In

re Angstadt 190 USPQ 219, to sustain a rejection under 35 USC 112, first paragraph, it is the Examiner's burden to show that a person of skill in the art must engage in undue experimentation or require ingenuity beyond that expected of a person of skill in the art to practice the claimed invention. According to In re Wands 8 USPQ2d 1400, an application does not fail to meet the 35 USC 112 enablement requirement even though experimentation is needed to determine samples useful to practice the claimed invention when the experimentation is not undue. The Examiner has not meet his burden under 35 USC 112, first paragraph, as articulated in In re Angstadt and In re Wands. Moreover under In re Angstadt, providing the examples in Applicants' specification with a $T_c < 26^\circ\text{K}$ is commendable frankness and part of Applicants' teaching on how to select a high T_c material. In re Angstadt and In re Wands hold that a claim is enabled if undue experimentation is not needed to determine if a particular species within the scope of the claim is effective to practice the claimed invention. This is the situation in the present application and the Examiner has not rebutted Applicants showing that only routine experimentation is needed to fabricate materials useful to practice Applicants' invention. It is Applicants' view that there can be no question that the record as a whole supports Applicants' view that all the claims are fully enabled. Thus, Applicants request withdrawal of the objection to the specification and the rejection of claims under 35 USC 112, first paragraph.

**THE EXAMINER HAS NOT REBUTTED APPELLANTS'
PROOF THAT THE TERMINOLOGY OF THE CLAIMS REJECTED
UNDER 35 USC 112, SECOND PARAGRAPH,
ARE UNDERSTOOD BY PERSONS OF SKILL IN THE ART**

The Examiners' rejection of claims as indefinite under 35 U.S.C. 112, second paragraph, for using terminology, such as "rare-earth like", "perovskite-like", "perovskite-type", "layer-like" and "layer-type" is a clear error since there are many issued patents having claims using terminology which is a combination of "-type", and "-like" and there are issued United States Patents having claims including the exact terminology objected to by the Examiner. The Examiner has given no reasons why the claims in the instant application are indefinite because of terminology using "-type" and "-like" while they are definite in the many cited issued patents. In the answer of the parent application, the Examiner has not rebutted Applicants' arguments in the brief. Applicants have provided extensive proof that this terminology was understood by persons of skill in the art at the time Applicants published their original article. Moreover, Applicants' original article was published about eight months before the filing date of the first application in the lineage of the present application. Since Applicants used this terminology in their original article, the use of this terminology was part of the vernacular of persons of skill in the art and is thus understood by persons of skill in the art as of the earliest filing date of the instant application. The book by Poole [Attachment 21] acknowledges this and uses this terminology. Thus Applicants respectfully request the Examiner to withdraw the rejection of claims under 35 USC 112, second paragraph.

DETAILED ARGUMENT IN REPLY TO THE
EXAMINER'S ANSWER IN THE PARENT APPLICATION

Claim 136 of the parent application was allowed at the time of Final Rejection of the parent application. Claims 114-116, 119-121, 124-126, 132, 133, 137, 138, 143, 144, 146, 148, 152-157, 160-163, 167, 168, 171, 172 and 173 of the parent application were subsequently allowed in the Examiner's answer of the parent application. These claims correspond to added claims herein 238-260, 263-265, 268-270, 276, 277, 280-282, 287, 288, 290, 293, 297-301, 304-307, 311, 312 and 315-317.

Claims herein remain rejected under 35 U.S.C. 112, first paragraph.

Claims herein remain rejected under 35 U.S.C. 112, second paragraph.

The 35 USC 102/103 Rejections Withdrawn
In the Parent Application In View of Applicants' Argument

Applicants acknowledge the Examiner's statement in the answer of the parent application that "[t]he prior art rejection over Asahi Shinbum, International Satellite Edition (London) November 28, 1986 (hereinafter, "the Asahi Shinbum article" [Attachment 6]) is withdrawn in view of applicant's remarks appearing at pages 39-44 of the supplemental response filed 8/5/99" of the parent application. Applicants respectfully submit that the Examiner has not withdrawn the rejection but has found the rejection moot in view of the fact that the Examiner has agreed that Applicants have

sufficiently demonstrated conception in the United States before the publication date of the Asahi Shinbum article and diligence to a reduction to practice.

***The Examiner Has Not Rebutted Applicants'
Claim of Priority to the Priority Document
In the Answer in the Parent Application***

Applicants disagree with the Examiner's statement "Accordingly, the issue of claims ... being supported by the priority document is believed moot in view of the withdrawal of the prior art rejections." Support for claims in a priority document is a separate and distinct issue from whether the claims are anticipated by a reference under 35 USC 102 or obvious over a reference under 35 USC 103. Therefore, the issue of claims supported by the priority document is not moot in view of the withdrawal of the prior art rejections. Since the Examiner in the answer did not rebut Applicants' detailed and specific argument rebutting the Examiner's view that Applicants' claims are not supported by the priority document, Applicants respectfully request the Examiner to grant Applicants' claim of priority to the priority document.

***The Examiner Has Not Rebutted Applicants' Argument In the In The Parent
Application That The Prior Art Rejections Necessarily Require That All Of
Applicants' Claims Rejected Under 35 USC 120/103 Are Fully Enabled***

In paragraph 9 of the Answer of the parent application entitled "Prior Art of Record" the Examiner states "No prior art is relied upon by the Examiner in the rejection of the claims under appeal". Applicants disagree. Claims have been rejected as anticipated

under 35 USC 102(a) by the Asahi Shinbum article [Attachment 6], and claims have been rejected as obvious under 35 USC 103(a) in view of the Asahi Shinbum article. These rejections have not in fact been withdrawn, but, as stated above, have in fact been found to be moot.

In the Final Action of the parent application all the claims, except claim 136 corresponding added claim 280 herein, were rejected either under 35 USC 102 or 35 USC 103 over the Asahi Shinbum article. Thus in the Final Action of the parent application, the Examiner is stating that everything within Applicants' non-allowed claims rejected under 35 USC 102 over this article, is found in the Asahi Shinbum article and a person of skill in the art can practice the invention of Applicants' claims rejected under 35 USC 102 with what is taught in the Asahi Shinbum article alone. Moreover, in the Final Action, the Examiner is stating that all the claims rejected under 35 USC 103 over the Asahi Shinbum article alone can be practiced by a person of skill in the art with what is taught in the Asahi Shinbum article in combination with what is known to a person of skill in the art. All of Applicants' claims rejected over the Asahi Shinbum article are dominant to (or generic to) the one claim, claim 136 corresponding added claim 280 herein, allowed in the Final Action of the parent application. Thus by stating that all the non-allowed claims are anticipated or obvious over the Asahi Shinbum article alone, the Examiner is stating that a person of skill in the art needs nothing more than what is taught in the Asahi Shinbum article [Attachment 6] or what is taught therein in combination with what is known to a person of skill in the art to practice that part of each of Applicants' non-allowed claims which does not overlap Applicants'

allowed claims. Thus, it logically follows from the 35 USC 102/103 rejections that all of Applicants' claims are fully enabled.

The Asahi Shinbum article states in the first paragraph:

A new ceramic with a very high T_c of 30K of the superconducting transition has been found. The possibility of high T_c - superconductivity has been reported by scientists in Switzerland this spring. The group of Prof. Shoji TANAKA, Dept. Appl. Phys. Faculty of Engineering at the University of Tokyo confirmed in November, that this is true.

and in the second paragraph:

The ceramic newly discovered, is an oxide compound of La and Cu with Barium which has a structure of the so-called perovskite and shows metal-like properties. Prof. Tanaka's laboratory confirmed that this material shows diamagnetism (Meisner effect) which is the most important indication of the existence of superconductivity.

The Swiss scientist are the inventors of the present application. Thus this clearly refers to Applicants' work which was reported in Applicants' article [Attachment 3] which is incorporated by reference in the present application. These passages say that Prof. Tanaka confirmed Applicants' work. The newly discovered ceramic referred to in the article is the ceramic reported on in Applicants' article. It is thus clear that for the Examiner to have rejected Applicants' claim over the Asahi Shinbum article under 35

USC 102 or 35 USC 103, the Examiner necessarily had to find that Applicants' article fully enabled their claims.

In the answer of the parent application the Examiner has not commented on nor rebutted these arguments. In Applicants' brief in the parent application at pages 21-22 and at pages 49-51 Applicants apply these arguments in detail to the rejection of Applicants' claims under 35 USC 102 and 35 USC 103, respectively. The Examiner, therefore, must be taken to agree with Applicants' argument in the brief of the parent application that their teaching has fully enabled all of their claims.

At pages 50-52 of the brief in the parent application, at the beginning of Applicants' arguments in regard to the objections and rejection based on 35 USC 112, first paragraph, Applicants have repeated these arguments, that is that the 35 USC 102/103 rejections over the Asahi Shinbum article logically requires that all of Applicants' claims are fully enabled by Applicants' teaching. The Examiner has again not responded nor rebutted them. The Examiner, therefore, must be taken to agree with Applicants' argument in the brief that their teaching has fully enabled all of their claims.

The Examiners rejections under 35 USC 102 and 103 over the Asahi Shinbum articles have been maintained since the Office Action dated August 26, 1992. Thus, the Examiner has maintained the view that all of Applicants' claims are fully enabled for about 12 years. The Examiner has not rebutted Applicants' arguments in rebuttal of the Examiner's objection under 35 USC 112, first paragraph, that the specification fails to

provide an enabling disclosure commensurate with the scope of the claims and the rejections of claims under 35 USC 112, first paragraphs, for lack of enablement.

In summary, all of Applicants' claims on appeal in the parent application added corresponding claims herein are 232-321, except for claim 136 added corresponding claim 280, were originally rejected under 35 USC 102 and/or 103 as being anticipated or obvious over the Asahi Sinbum article which only stated that a professor in Japan reproduced Applicants' work reported in Applicants' published article which was incorporated by reference in the present application. The only logical conclusion from these rejections is that Applicants' teaching fully enabled the claims originally rejected under 35 USC 102 and/or 103. The Examiner in the answer in the present application has not rebutted this. The Examiner has, therefore, conceded, and is estopped from denying, that all of Applicants' claims are fully enabled by Applicants' teaching.

Grounds For Rejection

In paragraph 10 of the answer of the parent application entitled "Grounds of Rejection".

The Examiner states:

The following ground(s) of rejection are applicable to the appealed claims:

The specification is objected to under 35 U.S.C. § 112, first paragraph, as failing to provide an enabling disclosure commensurate with the scope of the claims.

In support of this statement the Examiner states:

The present specification is **deemed** to be enabled only for compositions comprising a transition metal oxide containing at least a) an alkaline earth element and b) a rare-earth element or Group IIIB element. The art of high temperature (above 30°K) superconductors is an extremely unpredictable one. Small changes in composition can result in dramatic changes in or loss of superconducting properties. The amount and type of examples necessary to support broad claims increases as the predictability of the art decreases. Claims broad enough to cover a large number of compositions that do not exhibit the desired properties fail to satisfy the requirements of 35 U.S.C. 112. Merely reciting a desired result does not overcome this failure. In particular, the question arises: Will any layered perovskite material exhibit superconductivity.

A large number of examples are needed to support a broad claim in an unpredictable art only if a person of skill in the art has to engage in undue experimentation to determine embodiments not specifically recited in Applicants' teachings. It is the Examiner's burden to show that undue experimentation is necessary. The Examiner has presented no extrinsic evidence that a person of skill in the art would have to engage in undue experimentation. The Examiner has stated without support that the art of high temperature superconductivity is an extremely unpredictable one. Applicants have not merely stated a desired result as clearly shown by the five affidavits submitted by experts in the field, the Poole book [Attachment 21] and the Rao article [Attachment 42]. And it is not necessary for any layered perovskite to work to satisfy 35 USC 112,

first paragraph, it is only necessary that they can be determined without undue experimentation.

The Examiner in the answer in the parent application restates without support that "It should be noted that at the time the invention was made, the theoretical mechanism of superconductivity in these materials was not well understood. That mechanism still is not understood." Applicants note that the theory of superconductivity has been understood for some time. For example, at page 20 of the brief in the parent application the book by Von Laue is referred to [Attachment 5]. This book was published in English in 1952 and presents a comprehensive theory of superconductivity. The entire text of this book is included in Attachment 42 of this response.

Notwithstanding, for a claim to be enabled under section 112, it does not require an understanding of the theory. The Examiner then conclusorily states in the answer in the parent application "Accordingly, there appears to be little factual or theoretical basis for extending the scope of the claims much beyond the proportions and materials actually demonstrated to exhibit high temperature superconductivity". This statement is clearly inconsistent with *In re Angstadt* 190 USPQ 219 and *In re Wands* 8 USPQ2d 1400 which hold that to satisfy the first paragraph of 35 USC 112 it is only necessary that a person of skill in the art not exercise undue experimentation to make samples that come within the scope of the Applicants' claims. Applicants have clearly shown that only routine experimentation is needed to fabricate samples to practice Applicants' claimed invention. The Examiner has not denied, nor rebutted this. The Examiner again in the answer in the parent application incorrectly cites *Brenner v. Morrison*

stating a "patent is not a hunting license. It is not a reward for the search, but a reward for its successful conclusion". As stated in the brief of the parent application, this quote applies to utility not to enablement and is thus incorrectly cited by the Examiner.

Reply to Answer in the Parent Application
Paragraph (11) Entitled "Response to Argument"

The Examiner states in the answer of the parent application:

As discussed above in section 6 Issues, the prior art rejection over Asahi Shinbum, International Satellite Edition (London), November 28, 1986 (hereinafter, "the Asahi Shinbum article") is withdrawn in view of applicant's remarks. It is believed that the withdrawn of the prior art rejection addresses each of applicant's remarks appearing at pages 7-51 and pages 114-173 of the Substitute Brief filed 1/18/00 (paper #89).

Applicants disagree with the Examiner that "that the withdrawn of the prior art rejection addresses each of applicant's remarks appearing at pages 7-51 and pages 114-173 of the Substitute Brief". This is only true in so far as these pages contains arguments in rebuttal of the rejections under 35 USC 102 and 103 which have been rendered moot since the Examiner has been convinced by their arguments that Applicants conceived their invention in the United States prior to the date of the Asahi Sinbum article and were diligent to a reduction to practice. As noted above, the Examiner has not rebutted Applicants' argument that the 35 USC 102 and 103 rejections over the Asahi Sinbum article necessarily requires that Applicants have fully enabled all their claims.

Applicants acknowledge that the rejection under 35 USC 112, first paragraph, in the Final Office Action of the parent application, has been modified in scope in the answer of the parent application. The Examiner in the answer of the parent application has determined that the instant specification is enabled for compositions comprising a transition metal oxide containing an alkaline earth element and a rare-earth or Group IIIB element. Applicants disagree with this. As shown below there are numerous materials made according to Applicants' teaching which do not come within the scope of the claims allowed by the Examiner in the answer of the parent application.

The Examiner logically inconsistently with the 35 USC 102/103 rejection of Applicants' claims objects to Applicants' specification and rejects claims as not enabled under 35 USC 112, first paragraph. With respect to the remaining claims rejected under 35 U.S.C. 112, first paragraph, the Examiners referring to:

1. Applicants' remarks appearing at pages 52-101 of the Substitute Brief of the parent application;
2. Applicants' arguments filed 1/18/00;
3. the Affidavits filed September 29, 1995, January 3, 1996 (paper nos. 49 and 52);
4. the after-final submissions December 15, 1998: (1.132 Declarations of Mitzi, Tsuei, Dinger, Shaw and Duncombe) (Advisory mailed 2/25/99)

(Paper 77E)) states they "have been fully considered but they are not **deemed** to be persuasive." (emphasis added)

All after final submissions in the parent application are submitted in the present application. As noted at page 8 above "**deemed**" means to have an opinion: believe. The Examiner uses the word "deemed" often in the Examiner's answer of the parent application, that is, it is the Examiner's opinion or belief unsupported by any factual evidence. Applicants' view is that the Examiner's use of the word "deemed" necessarily requires a finding that the Examiner has not meet the Examiner's burden for establishing a case of lack of enablement since the argument is only based on the Examiner's opinion or belief and not on any significant factual evidence and is therefore, an unsupported conclusory statement. As noted at page 64 of the Brief In re Angstadt states at 190 USPQ 219:

We note that the PTO has the burden of giving reasons, supported by the record as a whole, why the specification is not enabling. In re Armbruster, 512 F.2d 676, 185 USPQ 152 (CCPA 1975). Showing that the disclosure entails undue experimentation is part of the PTO's initial burden under Armbruster; this court has never held that evidence of the necessity for *any* experimentation, however slight, is sufficient to require the applicant to prove that the type and amount of experimentation needed is not undue.

The Examiner in the answer of the parent application has not commented on Applicants' arguments rebutting the Examiner's reasons for non-enablement. The Examiner has not satisfied his burden of giving reasons, supported by the record as a whole, why the specification is not enabling. Applicants have provided extensive evidence that to practice Applicants' claimed invention does not require undue experimentation but only requires routine experimentation. That only routine experimentation is needed to practice Applicants' claimed invention is shown for example by the affidavits of Mitzi [Attachment 16], Dinger [Attachment 17], Tsuei [Attachment 18], Shaw [Attachment 19] and Duncombe [Attachment 20], the article of Rao et al. [Attachment 44] and the book of Poole et al. [Attachment 21] all of which state or show it is straight forward to use the general principles of ceramic science to make high T_c compositions, such as transition metal oxide superconductors, which is Applicants' teaching.

The Examiner has not rebutted this but merely **deems** Applicants' specification to be non-enabling, that is, it is the Examiners opinion or belief that Applicants' specification is nonenabling.

The Examiner further states in the answer of the parent application:

The additional case law and arguments by the Applicants have been duly noted. For the reasons that follow, however, the record as a whole is **deemed** to support the initial determination that the originally filed

disclosure would not have enabled one skilled in the art to make and use the invention to the scope that it is presently claimed. (Emphasis Added)

The Examiner has not commented upon nor rebutted Applicants' application of these cases to the facts of the present claims under examination. The Examiner merely **deems** (that is in the Examiner's unsupported conclusory opinion or belief that) "the originally filed disclosure would not have enabled one skilled in the art to make and use the invention to the scope that it is presently claimed." The Examiner presents no intrinsic or extrinsic facts to support the Examiner's opinion or belief. The Examiner has, therefore, not met his burden "of giving reasons, supported by the record as a whole, why the specification is not enabling." In re Armbruster, 512 F.2d 676, 185 USPQ 152 (CCPA 1975). Merely stating without evidentiary support that the art of high T_c superconductivity is unpredictable and stating without support that the theoretical mechanism is not understood does not satisfy the Examiner's burden.

The Examiner further states in the answer of the parent application:

The Applicants quote several passages from their specification at pp. 13-15 of their September 29, 1995 Amendment, but the issue is the scope of enablement, not support. The present disclosure may or may not provide support for particular embodiments, but the issue here is the scope to which that disclosure would have taught one skilled in the art how to make and use a composition which shows the onset of superconductivity at above 26°K. Construed in light of that issue, the invention is not **deemed** to have been fully enabled by the disclosure to the extent presently claimed. (Emphasis Added)

Again the Examiner **deems** Applicants' claims not enabled. At page 54 of the substitute brief of the parent application Applicants state "Applicants do not have to provide experimental results for every composition that fall within the scope of their claims when a person of skill in the art exercising routine experimentation has a reasonable expectation of success following Applicants' teaching to achieve a composition through which can be flowed a superconducting current according to the teaching of Applicants' specification." The Examiner has not commented upon nor rebutted this argument. As extensively shown in the substitute brief of the parent application, it is a matter of routine experimentation to make the compounds which come with in the scope of Applicants' claims. The Examiner has not commented on nor rebutted this. The Examiner merely states "Construed in light of that issue, the invention is not **deemed** to have been fully enabled by the disclosure to the extent presently claimed." Again, the Examiner is merely stating without any intrinsic or extrinsic evidence that it is the Examiners' conclusory opinion or belief that the invention is not fully enabled by the disclosure to the extent presently claimed. Again the Examiner has not met his burden "of giving reasons, supported by the record as a whole, why the specification is not enabling." In re Armbruster, 512 F.2d 676, 185 USPQ 152 (CCPA 1975).

The Examiner further states in the answer of the parent application:

(1) In their September 29, 1995 Amendment, the Applicants argue that their disclosure refers to "the composition represented by the formula RE-TM-0, where RE is a rare earth or rare earth-like element, TM is a

nonmagnetic transition metal, and O is oxygen", and list several species such as " $\text{La}_{2-x}\text{Ba}_x\text{CuO}_{4-y}$ " which they indicate are found in the present disclosure.

(2) Notwithstanding that argument, it still does not follow that the invention is fully enabled for the scope presently claimed. The claims include formulae which are much broader than the RE-TM-0 formula cited in the disclosure. Claim 24 recites "a transition metal oxide", claim 88 "a composition", and claim 96 "a copper-oxide compound".

Applicants note that their disclosure is not limited to any particular formula as implied by the Examiner. See for example the Summary of The Invention which states at page 7, lines 2-5, "In general, the compositors are characterized as mixed transition metal oxide systems where the transition metal can exhibit multivalent behavior".

As stated in the substitute brief of the parent application at pages 54-55:

According to *In re Angstadt* 190 USPQ 214, 218 in an unpredictable art, §112 does not require disclosure of a test with every species covered by a claim. The CCPA states:

To require such a complete disclosure would apparently necessitate a patent application or applications with "thousands" of examples or the disclosure of "thousands" of catalysts along with information as to whether each exhibits catalytic behavior resulting in the production of hydroperoxides. More importantly, such a requirement would force an inventor seeking adequate patent protection to carry out a prohibitive number of actual experiments. This would tend to discourage inventors

from filing patent applications in an unpredictable area since the patent claims would have to be limited to those embodiments which are expressly disclosed. A potential infringer could readily avoid "literal" infringement of such claims by merely finding another analogous catalyst complex which could be used in "forming hydroperoxides."

This is exactly the situation in the present application. If Applicants are limited to the claims of scope that are allowed by the Examiner in the parent application, a potential infringer could readily avoid "literal" infringement of such claims by merely finding, through routine experimentation, other compounds having a high T_c . As shown below there are numerous materials made according to Applicants' teaching which do not come within the scope of the claims allowed by the Examiner in the answer of the present application.

The Examiner further essentially repeats in the answer of the parent application what was stated in the Final Action of the parent application:

The present specification actually shows that known forms of a "transition metal oxide", "a composition", and "a copper-oxide compound" do not show the onset of superconductivity at above 26° K. At p. 3, line 20, through p. 4, line 9, of their disclosure, the Applicants state that the prior art includes a "Li-Ti-O system with superconducting onsets as high as 13.7°K." Official Notice is taken of the well-known fact that Ti is a transition metal. That disclosure also refers to "a second, nonconducting CuO phase" at p. 14, line 18.

In response to this Applicants stated at page 7 in the brief:

Applicants' claims are directed to "transition metal oxides", "a composition" and "a copper-oxide compound" having a T_c in excess of 26°K which is carrying a superconducting current. Applicants' claims do not include in the claimed method compositions having $T_c < 26^\circ\text{K}$. Thus the examples on page 3, line 20 - page 4, line 9, are not included in Applicants' claims. That these are transition metal oxides having $T_c < 26^\circ\text{K}$ does not mean that Applicants' claims directed to transition metal oxides, compositions and copper oxides having $T_c > 26^\circ\text{K}$ are not enabled. Applicants provide the teaching on how to fabricate such oxides having $T_c > 26^\circ\text{K}$. The "second non-conducting CuO phase" referred to at page 14, line 18, again does not mean that Applicants' claims are not enabled. Applicants' statements at page 14 is part of Applicants' teaching on how to achieve an oxide having a $T_c > 26^\circ\text{K}$. The Examiner is attempting to use Applicants' complete description of their teaching to show lack of enablement when, in fact, this complete teaching provides full enablement by showing how samples are and are not to be prepared. Applicants have claimed their invention functionally, that is, as a method of use so the Applicants' claim do not read on inoperable species. What the Examiner "**seems to be obsessed with is the thought of [transition metal oxides] which won't work to produce the intended result.** **Applicants have enabled those of skill in the art to see that this is a real possibility which is commendable frankness in a disclosure.**" In re Angstadt, Supra. (Emphasis Added)

The Examiner in the parent application and in this application has not commented on Applicants' citation of *In re Angstadt* in support of their position which has been presented as bolded and underlined above. The bolded section above applies to all Applicants' claims whether directed to "compositions", "transition metal oxide", "copper oxides", "ceramics" etc. The Examiner seems to be of the view that the first paragraph of 35 USC 112 requires absolute certainty. As stated in the substituted brief of the parent application at pages 54-55 according to *In re Angstadt* 190 USPQ 214, 218 in an unpredictable art, §112 does not require disclosure of a test with every species covered by a claim. In the answer of the parent application the Examiner has not responded nor rebutted Applicants' argument.

As stated by Applicants in the substitute brief of the parent application, in particular at page 63, according to *In re Angstadt* all that is necessary is that the experimentation required to determine which combinations have the desired result (i.e. T_c greater than 26°K) can be produced without undue experimentation and would not "require ingenuity beyond that to be expected of one of ordinary skill in the art". 190 USPQ, 214, 218 in *re Field v. Conover* 170 USPQ, 276, 279 (1971). Applicants have provided extensive evidence that compounds, for example transition metal oxides, can be made according to Applicants' teaching without undue experimentation and without requiring "ingenuity beyond that to be expected of one of ordinary skill in the art". In the answer of the parent application, the Examiner has not responded to nor rebutted Applicants' arguments.

The Examiner further states:

Accordingly, the present disclosure is not **deemed** to have been fully enabling with respect to the "transition metal oxide" of claim 24, the "composition" of claim 88,, or the "copper-oxide compound" of claim 96. (Emphasis added.)

Again without facts or acceptable reasons the Examiner "**deems**" Applicants' claims not enabled and for the reasons given above Applicants disagree. Applicants discovered that compositions, such as metal oxides, have $T_c \geq 26^\circ\text{K}$ that is why they were awarded a Nobel Prize. With respect to the transition metal oxide of claim 24 of the parent application and corresponding claim 232 of the present application, the "composition" of claim 88 of the parent application and corresponding claim 237 of the present application and the "copper-oxide compound" of claim 96 of the present application and corresponding claim 240 of the present application, there is no evidence in the record that a person of skill in the art cannot practice the claimed invention without undue experimentation. The only attempt made by the Examiner to factually support the Examiner's statement that the claims "are **deemed** not enabled" are the examples provided by Applicants which show $T_c < 26^\circ\text{K}$. Applicants provide this teaching so that a person of skill in the art will be fully informed on how to practice Applicants' invention. In this regard the Examiner states on in the answer of the parent application:

The examples at p. 18, lines 1-20, of the present specification further substantiates the finding that the invention is not fully enabled for the

scope presently claimed. With a 1:1 ratio of (Ba, La) to Cu and an x value of 0.02, the La-Ba-Cu-O form (i.e., "RE-AE-TM-0", per p. 8, line 11) shows no superconductivity". With a 2:1 ratio of (Ba, La) to Cu and an x value of 0.15, the La-Ba-Cu-O form shows an onset of superconductivity at " $T_c = 26^\circ\text{K}$ ". It should be noted, however, that all of the claims in this application require the critical temperature (T_c) to be "in excess of 26°K " or "greater than 26°K ".

Applicants note that all claims herein recite $T_c \geq 26^\circ\text{K}$ and Applicants note that Examiner states that "the present specification **further substantiates** the finding that the invention is not fully enabled" (Emphasis added) misrepresents the Examiner's argument up to this point since up to this point the Examiner has only used the unsupported statements that the theory of high T_c art is very unpredictable and that the theory of high T_c in these materials is not understood. These unsupported statements do not substantiate anything.

Applicants note that the Examiner cites in the answer of the parent application 3 examples from Applicants' specification which are transition metal oxides which do not have a have $T_c > 26^\circ\text{K}$: 1) a Li-Ti-O system with superconducting onsets as high as 13.7°K (cited at p. 3, line 20, through p. 4, line 9), 2) the 1:1 ratio with an $x=0.02$ sample cited on page 18, line 7, which did not show superconductivity, and 3) the 2:1 composition with $x=0.15$ with a resistivity drop that occurs at 26°K . Since in the present application all claims recite $T_c \geq 26^\circ\text{K}$, they are only two examples in the specification with T_c what is recited in the claims. Thus there are only two examples upon which the Examiner is "**deeming**" Applicants' claims not enabled. The Examiner

seems to be of the view that Applicants must have 100% predictability. Applicants and the courts disagree. The fact that there are compounds having $T_c < 26^\circ\text{K}$ does not mean that Applicants have not fully enabled their claimed invention. If only routine experimentation is needed to determine which compounds have $T_c \geq 26^\circ\text{K}$, without requiring ingenuity beyond that to be expected of one of ordinary skill in the art, then Applicants' disclosure enables Applicants' claims. In the substitute brief of the parent application at page 65 Applicants note that In re Angstadt states at 190 USPQ 219:

We note that the PTO has the burden of giving reasons, supported by the record as a whole, why the specification is not enabling. In re Armbruster, 512 F.2d 676, 185 USPQ 152 (CCPA 1975). **Showing that the disclosure entails undue experimentation is part of the PTO's initial burden under Armbruster; this court has never held that evidence of the necessity for any experimentation, however slight, is sufficient to require the applicant to prove that the type and amount of experimentation needed is not undue. ... Without undue experimentation or effort or expense the combinations which do not work will readily be discovered and, of course, nobody will use them and the claims do not cover them. The [Examiner] wants Applicants to make everything predictable in advance, which is impracticable and unreasonable. ... The key word is "undue," not "experimentation." (Emphasis Added)**

The Examiner has not commented on nor rebutted this argument. The Examiner's statement that "the present disclosure is not **deemed** to have been fully enabling" is not sufficient to meet the Examiner's burden under In re Armbruster and the Examiner has thus failed to establish that Applicants' claims are not enabled. Applicants do not have

to make everything predictable in advance where, as here, the experimentation to make samples that can be used within the scope of the Applicants' claims is not undue.

The Examiner further states in the answer of the parent application:

The Applicants also have submitted three affidavits attesting to the Applicants' status as the discoverers of materials that superconduct > 26°K. Each of the affidavits further states that "all the high temperature superconductors which have been developed based on the work of Bednorz and Muller behave in a similar manner (way)". Each of the affidavits add "(t)hat once a person of skill in the art knows of a specific transition metal oxide composition which is superconducting above 26°K, such a person of skill in the art, using the techniques described in the (present) application, which includes all known principles of ceramic fabrication, can make the transition metal oxide compositions encompassed by (the present) claims ... without undue experimentation or without requiring ingenuity beyond that expected of a person of skill in the art." All three affiants apparently are the employees of the assignee of the present application. Those affidavits do not set forth particular facts to support the conclusions that all superconductors based on the work behave in the same way and that one skilled in Applicants' work behave in the same way and that one skilled in the art can make those superconductors without undue experimentation. Conclusory statements in an affidavit or specification do not provide the factual evidence needed for patentability.

The Examiner in the answer of the parent application has incorrectly stated that Applicants have produced three affidavits. Applicants have produced five affidavits of affiants who are employed at the IBM, Thomas J. Watson Research Center. The affidavits of Shaw [Attachment 19] and Duncombe [Attachment 20] were reviewed and considered in paper 77E, page 2 and are referred to at page 10 of the answer of the parent application. The affidavits of Mitzi [Attachment 16], Dinger [Attachment 17], Tsuei [Attachment 18], Shaw [Attachment 19] and Duncombe [Attachment 20] and the book of Poole et al. [Attachment 21] state it is straight forward to use the general principles of ceramic science to make high T_c transition metal oxide superconductors following Applicants' teaching. The book of Poole et al. and the affidavit of Duncombe show numerous example of high T_c superconductors produced according to Applicants' teaching. The affidavits of Shaw and Duncombe cites numerous books and articles which provide the general teaching of ceramic science at the time of and prior to the filing date of the present application. The affidavit of Duncombe [Attachment 20] also provides several hundred pages copied from Mr. Duncombe's notebooks starting from before Applicants' filing date showing the fabrication of numerous samples. In regards to these pages, Mr. Duncombe states "I have recorded research notes relating to superconductor oxide (perovskite) compounds in technical notebook IV with entries from November 12, 1987 to June 14, 1998 and in technical notebook V with entries continuing from June 7, 1988 to May 1989." Mr. Duncombe's affidavit list some of the compounds prepared using the general principles of ceramic science: $Y_1 Ba_2 Cu_3 O_x$; $Y_1 Ba_2 Cu_3 O_3$; $Bi_{2.15} Sr_{1.98} Ca_{1.7} Cu_2 O_{\delta+8}$; $Ca_{(2-x)} Sr_x Cu O_x$ and $Bi_2 Sr_2 Cu O_x$. Applicants note that the last three examples do not come within the scope of the claims allowed by the

Examiner in the answer since they do not contain a rare earth or group III B element. The Examiner in the answer of the parent application has not commented on the data in Mr. Duncombe's affidavit [Attachment 20]. Mr. Duncombe's affidavit [Attachment 20] provides direct evidence that these examples were made following Applicants' teaching without undue experimentation. Moreover, in the answer in the parent application the Examiner quotes from the preface of the Poole article [Attachment 21] which states in part at A3: "The unprecedented worldwide effort in superconductivity research that has taken place over the past two years has produced an enormous amount of experimental data on the properties of the copper oxide type materials that exhibit superconductivity above the temperature of liquid nitrogen. ... During this period a consistent experimental description of many of the properties of the principal superconducting compounds such as BiSrCaCuO, LaSrCuO, TlBaCaCuO. and YBaCuO has emerged". The first and third of these compositions does not come within the scope of the claims allowed by the Examiner in the answer of the parent application since they do not contain a rare earth or group III B element, even though Poole states that they are easy to make following the general principals of ceramic science as taught by Applicants. Other data supporting Applicants' view is reported in the Review Article "Synthesis of Cuprate Superconductors" by Rao et al., IOP Publishing Ltd. 1993. A copy of this article is in Attachment 44 to this paper. This article lists in Table 1 the properties of 29 cuprate superconductors made according to Applicants' teaching. Twelve (#'s 1, 8-13, 16, 17, 20, 21, 27 and 28) of those listed do not come within the scope of the claims allowed by the Examiner. Only three of the 29 have a $T_c < 26^\circ\text{K}$. Those twelve do not contain one or more of a rare earth, a group IIIB element or an

alkaline earth element. It is thus clear that broader claims than allowed in the answer of the parent application should be allowed since it is clear that the allowed claims in the parent application can be avoided following Applicants' teaching without undue experimentation. Applicants are entitled to claims which encompass these materials since they were made following Applicants' teaching.

The article of Rao et al. [Attachment 44] in the first sentence of the introduction citing Applicants' article - which is incorporated by reference in their application - acknowledges that Applicants initiated the field of high T_c superconductivity. Applicants further note that the Rao article acknowledges that "a large variety of oxides" are prepared by the general principles of ceramic science and that Applicants discovered that metal oxides are high T_c superconductors. Citing reference 5 therein - the book "New Directions in Solid State Chemistry", Rao et al. 1989 (Cambridge; Cambridge University Press) for which there is a 1986 edition which predates Applicants' filing date Rao (See Attachments 43 and 45) - Rao et al. states:

Several methods of synthesis have been employed for preparing cuprates, with the objective of obtaining pure monophasic products with good superconducting characteristics [3, 4]. The most common method of synthesis of cuprate superconductors is the traditional ceramic method which has been employed for the preparation of a large variety of oxide materials [5]. Although the ceramic method has yielded many of the cuprates with satisfactory characteristics, different synthetic strategies have become necessary in order to control factors such as the cation composition, oxygen stoichiometry, cation oxidation states and carrier concentration. Specifically noteworthy amongst these methods are

chemical or solution routes which permit better mixing of the constituent cations in order to reduce the diffusion distance in the solid state [5, 6]. Such methods include coprecipitation, use of precursors, the sol-gel method and the use of alkali fluxes. The combustion method or self-propagating high-temperature synthesis (SHS) has also been employed.

Reference 5 is another example of a reference to the general principles of ceramic science incorporated into Applicants' teaching. The Rao et al. article [Attachment 44] states that the 29 materials reported on in the article and fabricated in Table 1 are fabricated using the general principles of ceramic science. Moreover, the Rao article states that these materials are fabricated by what the Rao article calls the "ceramic method" which is the preferred embodiment in Applicants' specification, yet 12 of the 29 materials in Table 1 do not come within the scope of the claims allowed by the Examiner in the answer of the parent application. Thus known examples fabricated according to Applicants' teaching will not be literally infringed by the Rao, Duncombe and Poole examples.

The Examiner further states in the answer of the parent application:

Those affidavits do not overcome the non-enablement rejection. The present specification discloses on its face that only certain oxide compositions of rare earth, alkaline earth, and transition metals made according to certain steps will superconduct at $> 26^{\circ}\text{K}$.

As stated above, In re Angstadt 190 USPQ 214, 218 held that in an unpredictable art, §112 does not require disclosure of a test with every species covered by a claim. As stated above, Applicants note that the Examiner has presented no extrinsic evidence that the art of high T_c superconductivity is unpredictable. It is the Examiner's burden to show that a person of skill in the art would have to engage in undue experimentation to practice Applicants' claimed invention. The Examiner has clearly not done this. The only evidence that the Examiner offers in support of his determination of nonenablement are two examples of metal oxide with $T_c < 26^\circ\text{K}$ which the Applicants with commendable frankness have included in their specification. Applicants also note, as stated above, there are many other materials made according to Applicants' teaching reported in the literature made following Applicants' teaching which do not come within the scope of the claims allowed in the Examiner's answer of the parent application.

The Examiner further states in the answer of the parent application:

Those affidavits are not **deemed** to shed light on the state of the art and enablement at the time the invention was made. One may know now of a material that superconducts at more than 26°K , but the affidavits do not establish the existence of that knowledge on the filing date for the present application. Even if the present application "includes all known principles of ceramic fabrication", those affidavits do not establish the level of skill in the ceramic art as of the filing date of that application.

The Examiner stated to the contrary in paper 77E page 2, that "It is the Examiner's maintained position that [the] general principles a ceramic fabrication were most certainly known prior to the filing date of the instant application." Thus the Examiner acknowledges that the general principles of ceramic science were known prior to Applicants' filing date. There is no evidence in the record to indicate that anything more is needed to fabricate compositions which can be used to practice Applicants' invention to the full scope that it is claimed in the present invention. To the contrary, Applicants have shown numerous examples in the affidavits and references of samples fabricated according to Applicants' teaching useful to practice their claimed invention. Notwithstanding, since the claims are apparatus for use claims, Applicants do not believe that they are required to provide a teaching of how to fabricate all compositions which may be used within the full scope of Applicants' claimed invention.

The Examiner acknowledges that the Applicants are the pioneers in high temperature metal oxide superconductivity. However, the Examiner states "The finding remains, nonetheless, that the disclosure is not fully enabling for the scope of the present claims". The Examiner has not commented on Applicants' comments in the substitute brief of the parent application that once Applicants discovered high T_c in metal oxides, it was straight forward for others following Applicants' teaching to make other examples of high T_c metal oxides. That Applicants were the pioneers in T_c metal oxides is not the only issue. The relative ease of making other compounds, such as, metal oxides, is equally important. Applicants' discovery is materials that are dielectric at room temperature had high T_c . The fabrication techniques are not Applicants' discovery

since these techniques, as acknowledged by the Examiner, were well known prior to Applicants' discovery.

The Examiner has cited seven decisions as providing the legal basis for this determination of non-enablement. In the substitute brief of the parent application Applicants have extensively shown how these seven cases support Applicants' position that they have fully enabled their claims. In the answer of the parent application, the Examiner has not rebutted Applicants' extensive analysis of these cases and how they apply to the present invention to support Applicants' view that Applicants' claims are fully enabled. The Examiner has not rebutted Applicants' arguments as to how the Examiner has misapplied these cases to the present application. The Examiner states "That case law speaks for itself". Applicants agree that the case law speaks for itself, that is, it supports Applicants' position that their claims are fully enabled. The Examiner apparently means by this statement that the case law supports the Examiner's position that the rejected claims are not enabled. The Examiner has not attempted to show how the facts of the cited cases relate to the facts of the present application. The Examiner has essentially taken statements out of context from these cases to support the Examiner's view. However, when the cases are analyzed as Applicants have done in the substitute brief of the parent application, it is clear that theses cases support Applicants' view that their claims are fully enabled.

The MPEP SECTION---2164.01(a) entitled "Undue Experimentation Factors" citing In re Wands 8USPQ2d 1400 states:

There are many factors to be considered when determining whether there is sufficient evidence to support a determination that a disclosure does not satisfy the enablement requirement and whether any necessary experimentation is "undue." These factors include, but are not limited to:

- (A) The breadth of the claims;
- (B) The nature of the invention;
- (C) The state of the prior art;
- (D) The level of one of ordinary skill;
- (E) The level of predictability in the art;
- (F) The amount of direction provided by the inventor;
- (G) The existence of working examples; and
- (H) The quantity of experimentation needed to make or use the invention based on the content of the disclosure.

The Examiner has not applied these factors. Applicants have shown that:

- (A) Their claims are as broad as their discovery which is that compounds, such as metal oxides, can carry a superconductive current for a $T_c \geq 26^\circ$ K;
- (B) The invention is easily practiced by a person of skill in the art;
- (C) The state of the prior art clearly shows how to fabricate materials which can be used to practice Applicants' invention;

(D) The level of one of ordinary skill in the art is not high since as stated in the Poole et al. book [Attachment 21] materials to practice Applicants' invention are easily made and all that is needed to practice Applicants' claimed invention is to cool the material below the T_c and to provide a current which will be a superconductive current. It has been well known how to do this since the discovery of superconductivity in 1911. (See page 1 of "Superconductivity" by M. Von Laue) [Attachment 42]

(E) There is no unpredictability in how to make materials to practice Applicants' invention and there is no unpredictability in how to practice Applicants' invention. The only unpredictability is which particular composition will have a $T_c \geq 26^\circ \text{K}$. As extensively shown by Applicants this is a matter of routine experimentation. The Examiner has not denied not rebutted this.;

(F) Applicants have provided extensive direction to make materials to practice their claimed invention. They have included all known principles of ceramic science. Also, as stated in the Poole book these materials are easily made. The Examiner has not denied nor rebutted this. The Examiner has made no comment on the amount of direction provided by the Applicants;

(G) Applicants have provided sufficient working examples and examples of compositions that have $T_c \geq 26^\circ \text{K}$ for a person of skill in the art to fabricate materials that can be used to practice Applicants' claimed invention; and

(H) Applicants have shown that the quantity of experimentation needed to make samples to use the invention based on the content of the disclosure in the specification is routine experimentation.

The MPEP SECTION---2164.01(a) further states:

The fact that experimentation may be complex does not necessarily make it undue, if the art typically engages in such experimentation. In re Certain Limited-Charge Cell Culture Microcarriers, 221 USPQ 1165, 1174 (Int'l Trade Comm'n 1983), aff'd. sub nom., Massachusetts Institute of Technology v. A.B. Fortia, 774 F.2d 1104, 227 USPQ 428 (Fed. Cir. 1985).

See also In re Wands, 858 F.2d at 737, 8 USPQ2d at 1404. The test of enablement is not whether any experimentation is necessary, but whether, if experimentation is necessary, it is undue. In re Angstadt, 537 F.2d 498, 504, 190 USPQ 214, 219 (CCPA 1976). MPEP 2164

There is no statement by the Examiner nor any evidence in the record that the experimentation to make materials to practice Applicants' claimed invention is complex or undue. But it is clear that even if the experimentation was complex to make samples to practice Applicants' claimed invention it would not render Applicants' claims not enabled since the art typically engages in the type of experimentation taught by Applicants to make samples to practice their claimed invention.

The facts of In re Wands have similarity to the facts of the present application under examination. The Court at 8 USPQ2d 1406 held that:

The nature of monoclonal antibody technology is that it involves screening hybridomas to determine which ones secrete antibody with desired

characteristics. Practitioners of this art are prepared to screen negative hybridomas in order to find one that makes the desired antibody.

Correspondingly Applicants have shown that the nature of high T_c technology is that it involves preparing samples to determine which ones have $T_c \geq 26^\circ\text{K}$ - the desired characteristic. Practitioners of this art are prepared to prepare samples in order to find one that have the desired T_c . Nothing more is required under *In re Wands*.

Applicants have shown that their specification is enabling with respect to the claims at issue and that there is considerable direction and guidance in the specification; with respect to Applicants' claimed invention there was a high level of skill in the art to fabricate samples at the time the application was filed; and all of the methods needed to practice the invention were well known. Thus Applicants have shown that after considering all the factors related to the enablement issue, it would not require undue experimentation to obtain the materials needed to practice the claimed invention. The Examiner has not denied nor rebutted this.

A conclusion of lack of enablement means that, based on the evidence regarding each of the above factors, the specification, at the time the application was filed, would not have taught one skilled in the art how to make and/or use the full scope of the claimed invention without undue experimentation. *In re Wright*, 999 F.2d 1557, 1562, 27 USPQ2d 1510, 1513 (Fed. Cir. 1993). It is the Examiner's burden to show this and the Examiner has clearly not done so.

The breadth of the claims was a factor considered in *Amgen v. Chugai Pharmaceutical Co.*, 927 F.2d 1200, 18 USPQ2d 1016 (Fed. Cir.), cert. denied, 502 U.S. 856 (1991). In the *Amgen* case, the patent claims were directed to a purified DNA sequence encoding polypeptides which are analogs of erythropoietin (EPO). The Court stated that:

Amgen has not enabled preparation of DNA sequences sufficient to support its all-encompassing claims. . . . [D]espite extensive statements in the specification concerning all the analogs of the EPO gene that can be made, there is little enabling disclosure of particular analogs and how to make them. Details for preparing only a few EPO analog genes are disclosed. . . . This disclosure might well justify a generic claim encompassing these and similar analogs, but it represents inadequate support for Amgen's desire to claim all EPO gene analogs. There may be many other genetic sequences that code for EPO-type products. Amgen has told how to make and use only a few of them and is therefore not entitled to claim all of them. 927 F.2d at 1213-14, 18 USPQ2d at 1027.

In the present application Applicants have provided a teaching (and proof thereof) of how to make all known high T_c materials useful to practice their claimed invention. As the *Amgen* court states this type of disclosure justifies a generic claim. As the *In re Angstadt* court states the disclosure does not have to provide examples of all species within Applicants' claims where it is within the skill of the art to make them. There is no evidence to the contrary.

The Examiner states in the answer of the parent application "[t]he appellants argue that their own examples do not support the determination of non-enabling scope of the invention. Nevertheless, the record is viewed as a whole. If the Applicants could not show superconductivity with a $T_c > 26^\circ\text{K}$ for certain compositions falling within the scope of the present claims, it is unclear how someone else skilled in the art would have been enabled to do so at the time the invention was made." The Examiner avoids the essential issues. Even though Applicants' claims do not cover inoperable species, In re Angstadt clearly permits a claim to include inoperable species where to determine which species works does not require undue experimentation. The Examiner has not presented any substantial evidence that undue experimentation is required to practice Applicants' claim. This is the Examiner's burden. On the other hand, Applicants have presented five affidavits of experts, the book of Poole [Attachment 21] and the article of Rao all of which agree that once a person of skill in the art knows of Applicants' invention, it is straight forward to fabricate other sample. Also, in response to the Examiner's inquiry, "if the Applicants could not show superconductivity with a $T_c > 26^\circ\text{K}$ for certain compositions falling within the scope of the present claims, it is unclear how someone else skilled in the art would have been enabled to do so at the time the invention was made", it is clear that a person of skill in the art would have been enabled by routine experimentation following Applicants' teaching to determine other samples with $T_c \geq 26^\circ\text{K}$. This is all that is required, and there is no evidence in the record to the contrary.

In the prosecution and the substitute brief of the parent application, Applicants have noted that the Examiner has taken a contrary view to Applicants' five affiants each of whom has qualified himself as an expert in the field of ceramic technology and in superconductivity. Also, the Examiners' argument for nonenablement is primarily based on the Examiner "**deeming**" the rejected claims nonenabled based on the unsupported assertion that the art of high T_c is unpredictable and not theoretically understood, that is, the Examiner's conclusory opinion or belief that the claims are not enabled. In the prosecution and the substitute brief of the parent application Applicants requested the Examiner to submit an affidavit to qualify himself as an expert to conclusorily "**deem**" the rejected claims nonenabled and to substantiate the unsupported assertions. The Examiner has not submitted an affidavit. 37 CFR 104(d)(2) states "[w]hen a rejection in an application is based on facts within the personal knowledge of an employee of the office ... the reference must be supported when called for by the Applicants, by an affidavit of such employee." (Emphasis Added)

The Examiner further states in the answer of the parent application:

The Applicants argue that the "Examiner has provided no substantial evidence to support this assertion (of non-enabling scope of the invention). It is respectfully requested that the Examiner support (his) assertion with factual evidence and not unsupported statements." Nevertheless, the determination of nonenabling scope is maintained for the reasons of record.

Applicants note the Examiner has not responded to Applicants' request that the Examiner support his view on nonenablement with an affidavit of facts rather than unqualified conclusory statements.

The Examiner further states in the answer of the parent application:

The appellants argue that the "standard of enablement for a method of use is not the same as the standard of enablement for a composition of matter" and that their claimed invention is enabling because it is directed to a method of use rather than a composition. Basis is not seen for that argument, to the extent that it is understood.

Applicants discovered that compositions, such as metal oxides, had $T_c \geq 26^\circ\text{K}$. This was not known prior to Applicants' discovery. Once this is realized, the only enablement required for Applicants' claims are to cool a metal oxide below the T_c and to provides a superconducting current. It is not necessary for Applicants to provide a detailed method of making every composition which can be used within the scope of their claims. Applicants' claims are not directed to the composition of matter. They are directed only to the use of the metal oxide as a superconductor with a $T_c > 26^\circ\text{K}$, that is, as a circuit element in operation. It was within the skill of the art to fabricate compositions using the Applicants' teaching and test them for a $T_c \geq 26^\circ\text{K}$ using techniques well known prior to Applicants' filing date.

Applicants agree that apparatus for use claims are subject to the statutory provisions of 35 U.S.C. 112, first paragraph. However, those provisions are directed to the claimed apparatus for use invention and not to a composition of matter claim. It is not relevant how a composition, which can be used to practice Applicants' claims, is made since the invention is how the composition is used. Thus the type of enablement is different. For example, if a circuit containing a resistor is claimed, the Applicant does not have to teach all known methods to fabricate the resistor and the claim will read on circuits including resistors made by methods discovered after the filing date of the application. Here Applicants are claiming a high T_c superconductor (a type of resistor) that carries a superconducting current below a temperature of $T_c \geq 26^\circ\text{K}$. This is a circuit element in operation.

The Applicants asserted in the substitute brief of the parent application and in the prosecution that the Examiner has not shown by evidence not contained within Applicants' teaching that the art of high T_c superconductors is unpredictable. In response the Examiner states in the answer of the parent application "[t]o the extent that the same assertion is understood, the rejection is maintained for the reasons of record." Applicants' statement is very clear. The Examiner is trying to avoid the issue since the Examiner has not shown by evidence not contained within Applicants' teaching that the art of high T_c superconductors is unpredictable. The Examiner has merely "**deemed**" it to be so.

Applicants have extensively referred to "Copper Oxide Superconductors" by Charles P. Poole, Jr., et al., (hereinafter, "the Poole book" or "the Poole article" [Attachment 21]) as supporting their position that higher temperature superconductors were not that difficult to make after their original discovery. This is because methods of making compositions which could be used to practice Applicants' claimed invention were well known prior to Applicants' discovery that metal oxides had a $T_c \geq 26^\circ\text{K}$. In response the Examiner states "Initially, however, it should be noted that the Poole article [Attachment 21] was published after the priority date presently claimed". It is not relevant that the Poole article [Attachment 21] was published after the priority date since it is clear evidence that only routine experimentation was needed to practice Applicants' claimed invention and there is no indication that anything more than Applicants' teaching is needed. The Examiner further comments on the Poole book [Attachment 21] stating, "[a]s such, it does not provide evidence of the state of the art at the time the presently claimed invention was made". As noted in the substitute brief of the parent application, Poole clearly states that the materials that can be used within the scope of Applicants' claims were easily made. And as stated above the Examiner has acknowledged that the fabrication techniques were well known prior to Applicants' invention. Poole states that is why so much work was done in so short a period of time. This is clear and convincing evidence that persons of skill in the art were fully enabled by Applicants' teaching to practice Applicants' claimed invention. It is not necessary for Applicants to show that the data was generated prior to Applicants' filing date. The Examiner has not stated, nor is there any evidence presented by the Examiner, nor is there any indication in the Poole book that anything more than what Applicants taught was necessary to

practice Applicants' claimed invention. It is only necessary that persons of skill in the art can practice Applicants' claimed invention from Applicants' teaching without undue experimentation. As stated in *In re Angstadt* there is no requirement of no experimentation to practice the claimed invention which is the standard the Examiner is apparently applying.

The Examiner further states in the answer of the parent application:

Moreover, the present claims are directed to processes of using metal oxide superconductors, not processes of making them. Even if the Poole article provided direct evidence of the state of the art at the time the invention was made, which it apparently does not, that evidence still does not pertain to the issue at hand, namely, the process of using metal oxide superconductors to conduct electricity under superconducting conditions.

The Poole article clearly does not pertain to the process of using metal oxide superconductors to conduct electricity under superconducting conditions prior to Applicants' invention since this is Applicants' discovery and their invention. The Poole article [Attachment 21] clearly shows that once Applicants revealed their discovery, it was easy to practice Applicants' invention and to fabricate other materials to practice Applicants' claimed invention. It is not relevant that the Poole article is after the date of Applicants' patent application since there is no indication in Poole that anything more than what Applicants have taught was used to create the easily created high T_c materials referred to by Poole. The Poole article clearly shows how these easily made materials can be used to practice Applicants' claimed invention. The Poole book

[Attachment 21] is directed to materials carrying a superconducting current at $T_c \geq 26^\circ\text{K}$ which can be used in a variety of circuit configurations. Chapter 10 pp. 196-218 of the Poole book [Attachment 21] is directed to the process of using superconductors according to Applicants' teaching to conduct electricity under superconducting conditions. The first paragraph of Chapter 10 states:

The principal applications of superconductors are based upon their ability to carry electric current without any loss, and therefore it is important to understand their transport properties. This chapter begins with a discussion of resistivity and critical current flow in the absence of externally applied fields. This is followed by a discussion of several techniques involving applied fields and thermal effects. The chapter concludes with sections on tunneling and the Josephson effect.

Applicants acknowledge the Preface of the Poole Article states in part at A3:" The field of high-temperature superconductivity is still evolving ..." And Applicants agree with the Examiner that "the field of high-temperature superconductivity continued to grow, on the basis of on-going basic research, after the Bednorz and Meuller article was published." The automobile was discovered prior to 1900 and that field still, more than 100 years latter, continues to grow. The inventor of the automobile would have been able to claim an "automatically moving carriage under the power of an engine" which would be dominant to every automobile manufacture today even through the automobile technology of today was unknown 100 years ago. Notwithstanding such a dominant claim, others could invent more specific improvements as the field continued to grow, on the basis of on-going basic research. That the field of high-temperature

superconductivity continued to grow, on the basis of on-going basic research, after the Bednorz and Meuller article was published does not mean that Applicants are not entitled to a claim to their discovery event though it may dominate the inventions of others based on subsequent on-going basic research where that ongoing basic research followed Applicants' teaching to fabricate, as taught by Applicants, other specific materials to use as taught by Applicants.

In the first two full paragraphs on page 20 of the answer of the parent application the Examiner incorrectly refers to three affidavits submitted by Applicants. Applicants have submitted five affidavits [Attachment 16, 17, 18, 19, 20] all of which, as noted above, have been considered and entered. The affidavits of Shaw [Attachment 19] and Duncombe [Attachment 20] cited numerous text and articles in support of their affidavits. The affidavit of Duncombe [Attachment 20] provides several hundred pages of experimental data in regards to fabrication of numerous examples of metal oxides to practice Applicants' claimed invention.

Applicants disagree that they have only enabled compositions containing an alkaline earth element and a rare earth or Group IIIB element to result in superconductive compounds which may in turn be utilized in the instantly claimed methods. As noted above, there are numerous examples of high T_c superconductors made using the general principals of ceramic science as taught by Applicants that existed prior to Applicants' earliest filing date. Some of that data is in the affidavit of Duncombe [Attachment 20], the Poole book [Attachment 21] and the Rao article.

In regards to the affidavits of Tsui [Attachment 18], Dinger [Attachment 17] and Mitzi [Attachment 16] the Examiner states "However, that additional indication also is considered to be a conclusory statement unsupported by particular evidence." To the extent that this statement is true the affidavits of Shaw [Attachment 19] and Duncombe [Attachment 20], the book by Poole and the article by Rao provide particular evidence. In the answer of the parent application even though these affidavits and the book by Poole [Attachment 21] have been considered, the Examiner has not commented on this particular evidence and the Examiner has not stated that this particular evidence does not support Applicants' view that their claims are fully enabled.

The Examiner in the answer of the parent application restates what is stated in the affidavits and comments in the answer of the parent application:

It is the Examiner's maintained position that while general principles of ceramic fabrication were most certainly known prior to the filing date of the instant application, the utilization of such techniques to produce superconductive materials within the scope of the instant claims were not known. The affidavits are not effective to demonstrate enablement at the time the invention was made. As stated in paper #66, page 8, one may now know of a material that superconducts at more than 26K, but the affidavits do not establish the existence of that knowledge on the filing date of the present application.

The Examiner states: " The affidavits are not effective to demonstrate enablement at the time of the invention was made". Applicants disagree that Applicants' five affidavits do not demonstrate enablement at the time the invention was made. The affidavits clearly state that the knowledge that existed prior to Applicants' filing date permitted a person of skill in the art to practice Applicants' invention as claimed without undue experimentation. The Examiner has presented no evidence to the contrary.

It is not necessary for Applicants to provide experimental evidence for all materials that come within the scope of Applicants' claims. It is only necessary that a person of skill in the art can practice Applicants' claimed invention without undue experimentation or without requiring ingenuity beyond that expected of a person of skill in the art. It is the Examiner's burden to show that undue experimentation is required. The Examiner has not done this. Also, that there may be specific compounds having high T_c , which are not specifically identified in Applicants' specification does not mean that Applicants are not entitled to a claim generic to such a species where that species can be made without undue experimentation following Applicants' teaching. In re Robins 166 USPQ 552, 555, CCPA 1970. Representative samples are not required by the statute and are not an end in themselves. The Examiner has not shown that a person of skill in the art must exercise undue experimentation to make such a species. Thus the Examiner has failed to meet his burden.

The Examiner concedes that "that while general principles of ceramic fabrication were most certainly known prior to the filing date of the instant application, the utilization of such techniques to produce superconductive materials within the scope of the instant claims were not known." The Examiner has acknowledged that techniques to fabricate materials for use within the scope of Applicants' claims were known prior to Applicants' invention. Applicants agree that "the utilization of such techniques to produce superconductive materials within the scope of the instant claims were not known," since this was Applicants' invention. If "the utilization of such techniques to produce superconductive materials within the scope of the instant claims" were known prior to Applicants' invention, Applicants would not be the inventor. Prior to Applicants' discovery persons of skill in the art would not make materials, such as metal oxides, to use as a superconductor with a $T_c \geq 26^\circ\text{K}$ since such use had to await Applicants' discovery. Such fabrication techniques have been used to produce materials, such as metal oxides, for use for some other purpose for a very long time as shown by Applicants' evidence.

The affidavit of Leonard submitted December 15, 1998 [Attachment 22] shows that 5,689 articles reference Applicants' article. The Examiner apparently wants to limit Applicants' claims to their specific embodiments when the record as a whole clearly shows that all known high T_c materials can be made according to Applicants' teaching. If the Applicants are limited, as the Examiner would have them limited, they should not have revealed their discovery and instead spent the rest of their life, in secret,

experimenting to generate these 5,689 experimental efforts, according to their original teaching, so that they could get generic claims to their original discovery.

For the reasons given above and Applicants respectfully request withdrawal of rejection of claims under 35 USC 112, first paragraph.

35 USC 112, Second Paragraph Rejections

With respect to the claims rejected under 35 U.S.C. 112, second paragraph, the Examiner in the answer of the parent application has not rebutted Applicant's remarks appearing at pages 102-113 of the Substitute Brief of the parent applicant. In response to Applicants' arguments that the terms "rare-earth like", "perovskite-like", "layer-type", "layer-like" and "perovskite-type" are definite, the Examiner states "those arguments are not found to be persuasive," but the Examiner gives no reasons for this view.

At page 21 of the answer of the parent application, the Examiner comments in regard to the claims rejected under 35 UCS 112, second paragraph, the Examiner states that "[n]ote the Examiner declines to comment on Applicants' remarks regarding the after-final submissions which have not been entered or considered by the Examiner." All those after final submission of the parent application have been submitted in the present prosecution. These submissions provide evidence that the terminology "perokskite-like", perovskite-type", and "rare-earth-like" were understood by persons of skill in the art prior to Applicants' filing date. This evidence is in addition to evidence previously submitted to show that theres terms were well understood in the art. Some

of the additional evidence is issued US patents having claims containing the identical terminology which the Examiner finds indefinite. Other evidence is issued US patents using similar terminology in issued claims indicates that the use of such terminology in US patent claims is standard USPTO practice.

The Examiner states in the answer of the parent application:

Each patent application is considered on its own merits. In some contexts it may have been clear in the art to use the term "like", such as when the "like" term is sufficiently defined. In the present case, however, the terms "rare-earth like" and "perovskite-like" are unclear.

There are many issued patents having claims including terminology "-type", "-like" and similar combination terms. The Examiner's refusal to give reasons for rejecting Applicants' use of this terminology while there are many issued patents using this terminology in the claims is "arbitrary and capricious". The Examiner must give reasons. It is not sufficient to say "Each patent application is considered on its own merits" without giving reasons as to what the merits are in the present application which render these terms indefinite while not indefinite in the claims of very many issued patents.

Appellant's published their publication in Z. Phys. B - Condensed Matter 64 (1986) 189-193 (Sept. 1986) [Attachment 3] which is incorporated by reference in the present specification at page 6, lines 7-10. Applicants filed the first application in the lineage for

the present application on May 22, 1987. To the extent that the terminology "perovskite-type", "perovskite-like", etc. were not known prior to Applicants' discovery, it was placed into the vernacular of persons of skill in the art in the approximately eight months between the publication of Applicants' article and the earliest filing date of the present application. Applicants' article was published in a highly regarded physics journal. The referees for the article apparently understood what Applicants meant by this terminology. The Applicants were awarded a Nobel Prize based on this article. The Nobel committee apparently understood what Applicants were referring to.

Applicants' article at page 189, fourth line of the abstract, refers to "a perovskite-like mixed-valent copper compound"; at page 189, lines 14-15 of the right column, refers to "perovskite-type or related metallic oxides"; at page 192, line 12 of the left column, refers to "layer-like phases"; and the 8th line of the conclusion at page 192 refers to "a metallic perovskite-type layer-like structure". As stated in the substitute brief of the parent application at pages 106-107 the book by Poole uses this terminology attributing it to Applicants' article. Chapter VI, Section D, of the Poole Book [Attachment 21] is entitled "Pervoskite-type Superconducting Structures" pp. 78-81. It is thus clear that the objected to terminology is understood by persons of skill in the art as of the earliest filing date of the present application. Moreover, as shown in the substitute brief of the parent application 102 issued United States Patents uses the terminology "pervoskite like", two of which use this term in the claims. It is thus accepted USPTO practice to accept this term as definite. Also, as shown in the brief there are many issued patents using combinations of "-type" and "-like" with claims. Thus it is accepted USPTO practice to accept such terminology as definite.

Moreover, in the substitute brief of the parent application at pages 7-20, Applicants extensively discuss the terminology of the present application which incorporates by reference Applicants' article.

Moreover, the affidavits of Duncombe [Attachment 20] and Shaw [Attachment 19] refer to a number of articles and texts on the general principles of ceramic science. One of these texts is "Structures, Properties and Preparation of Perovskite-type Compounds", F. S. Galasso (1969). This book was published about eighteen years before Applicants' filing date. A copy of the complete text of this book was provided with the affidavits. The Examiner does not comment on why a person of skill in the art would not know what a perovskite-type compound was in view of this book and the teaching of Applicants' article.

At page 105 of the substitute brief of the parent application Applicants note that in Attachment A of their response of December 11, 1998, there are listed 68 United States Patents using the terminology "rare earth like" or rare earth and the like" and in Attachment 43 of this response there are listed 4 United States Patents with the term "rare earth like" or similar term in the claims. The Examiner has not commented on why this term is not understood by a person of skill in the art in view of the use of this term in the specification and claims of issued United States Patents. In the substitute brief of the parent application Applicants refer to numerous articles using the terminology "rare-earth-like" published before Applicants' filing date. The Examiner has not

commented on this. Applicants explain the meaning of "rare-earth-like" at page 7, lines 8-25, "[a] rare earth-like element (sometimes termed a near rare earth element) is one whose properties make it essentially a rare earth element ...".

It is thus clear that the meaning of "perovskite-type", "perovskite-like", "rare-earth-like", "layer-type" and "layer-like" are apparent from Applicants' teaching and the prior art, and that it is accepted USPTO practice to use such terminology in the claims. The Examiner has not commented on nor rebutted Applicants' arguments. The Examiner has merely stated that these terms are indefinite without further comment.

For reasons given above, Applicants respectfully request the Examiner to withdraw the rejection of claims under 35 USC 112, second paragraph.

Above, reference was made to the article "Synthesis of Cuprate Superconductors" by Rao et al., IOP Publishing Ltd. 1993. A copy of this article is in Attachment 44 to this paper. This article lists in Table 1 the properties of 29 cuprate superconductors made according to Applicants' teaching. Twelve (#'s 1, 8-13, 16, 17, 20, 21, 27 and 28) of those listed do not come within the scope of the claims allowed by the Examiner in the answer of the parent application. Only three of the 29 have a $T_c < 26^\circ\text{K}$. Those twelve do not contain one or more of a rare earth, a group IIIB element or an alkaline earth element. It is thus clear that claims of broader scope than allowed in the answer of the parent application should be allowed since it is clear that the scope allowed claims can be avoided following Applicants' teaching without undue experimentation.

The article of Rao et al. in the first sentence of the introduction citing Applicants' article - which is incorporated by reference in their application - acknowledges that Applicants initiated the field of high T_c superconductivity. Applicants further note that the Rao article acknowledges that "a large variety of oxides" are prepared by the general principles of ceramic science and that Applicants discovered that metal oxides are high T_c superconductors.

Citing reference 5 therein - the book "New Directions in Solid State Chemistry", Rao et al. 1989 (Cambridge; Cambridge University Press) for which there is a 1986 edition which predates Applicants' filing date Rao (See Attachment 47) - Rao et al. states:

Several methods of synthesis have been employed for preparing cuprates, with the objective of obtaining pure monophasic products with good superconducting characteristics [3, 4]. The most common method of synthesis of cuprate superconductors is the traditional ceramic method which has been employed for the preparation of a large variety of oxide materials [5]. Although the ceramic method has yielded many of the cuprates with satisfactory characteristics, different synthetic strategies have become necessary in order to control factors such as the cation composition, oxygen stoichiometry, cation oxidation states and carrier concentration. Specifically noteworthy amongst these methods are chemical or solution routes which permit better mixing of the constituent cations in order to reduce the diffusion distance in the solid state [5, 6]. Such methods include coprecipitation, use of precursors, the sol-gel method and the use of alkali fluxes. The combustion method or

self-propagating high-temperature synthesis (SHS) has also been employed.

Reference 5 is another example of a reference to the general principles of ceramic science incorporated into Applicants' teaching. The Rao et al. article states that the 29 materials reported on in the article and listed in Table 1 are fabricated using the general principles of ceramic science. Moreover, the Rao article states that these materials are fabricated by what the Rao article calls the "ceramic method" which is the preferred embodiment in Applicants' specification, yet 12 of the 29 materials in Table 1 do not come within the scope of the claims allowed by the Examiner in the answer. Thus known examples fabricated according to Applicants' teaching will not be literally infringed by the Rao, Duncombe [Attachment 20] and Poole [Attachment 21] examples.

Attachment 46 there are copies of the table of contents and Chapter 3 the 1989 edition of reference 5. Chapter 3 is entitled "Preparative Strategies". In Attachment 47 there are copies of the table of contents and Chapter 3 of the 1986 edition of reference 5. Chapter 3 in each edition is substantially the same. Since the publication date of the 1986 edition is before Applicants' filing date, all 29 of the high T_c materials in table 1 of the Rao article are made according to the general principals of ceramic science as taught by Applicants.

Attachment 48 is a Table of high T_c materials from the "CRC Handbook of Chemistry and Physics" 2000-2001 Edition. Attachment 49 is a copy of this table with hand written numbers to the left of the materials. There are a total of 42 materials listed in Table 1

(those marked with an asterisk in the table in Attachment 49 #'s 1, 7-13, 16-18, 20, 21, 27, 28, 30, 31 and 41-44) of which 21 do not contain one or more of a rare earth, a group III element or an alkaline earth element. Yet all 42 are made according to the general principals or ceramic science taught by Applicants. Two of the 42 materials have a T_c of 25°K. Thus a person of skill in the art following Applicants' teaching can fabricate materials which do not infringe the claims allowed by the Examiner in the parent application but do not infringe claims not allowed by the Examiner in the parent application.

Table 1 in Attachment 48 list 7 references as the source of the information on the 42 high T_c materials. Those references are listed below. For references 1-5 Attachments 50 to 56, respectively, contain the title page and table of contents of the corresponding book. References 6 and 7 are article, copies of which are in Attachments 55 and 56 respectively.

1. Attachment 50

Ginsburg, D.M., Ed., Physical Properties of High-Temperature Superconductors, Vols. I-III, World Scientific, Singapore, 1989-1992.

2. Attachment 51

Rao, C.N.R., Ed., Chemistry of High-Temperature Superconductors, World Scientific, Singapore, 1991.

3. Attachment 52

Shackelford, J.F., The CRC Materials Science and Engineering Handbook, CRC Press, Boca Raton, 1992, 98-99 and 122-123.

4. Attachment 53

Kaldis, E., Ed., Materials and Crystallographic Aspects of HTc-Superconductivity, Kluwer Academic Publ., Dordrecht, The Netherlands, 1992.

5. Attachment 54

Malik, S.K. and Shah, S.S., Ed., Physical and Material Properties of High Temperature Superconductors, Nova Science Publ., Commack, N.Y., 1994.

6. Attachment 55

Chmaissem, O. et al., Physica C230, 231-238, 1994.

7. Attachment 56

Antipov E. V. et al., Physica C215, 1-10, 1993, 231-238, 1994.

Copies of the books corresponding to #'s 1 to 5 were submitted on the parent application. Since these books are expensive and difficult to acquire, Examiner Kopec informed the undersigned attorney that additional copies do not have to be submitted in the present application and that the copies of the books submitted in the parent application will be used in the examination of the present application. There is no evidence in these references that the 42 high T_c materials of Attachment 48 cannot be made following Applicants' teaching.

ADDITIONAL REMARKS CITING PORTIONS OF THE FILE HISTORY

Claims of the present application have been rejected as not enabled under 35 U.S.C. 112, first paragraph. Applicants disagree for the reasons previously noted. Applicants in addition point out the following.

The present application is a Continuation of 08/060,470 filed on 05/11/93, which is a Continuation of 07/875,003 filed on 04/24/92, which is a Divisional of 07/053,307 filed on 05/22/87 all now abandoned.

In the 07/053,307 ancestral application composition of matter claims were presented for examination. A copy of the Final Rejection referred to below in this application is in Attachment 57 of this paper.

In the 07/053,307 ancestral application composition of matter, claims 1 through 11 inclusive, 27 through 35 inclusive, 40 through 54 inclusive, 60 through 63 inclusive, and 65 through 68 were finally rejected under 35 U.S.C. 102(b) or in the alternative under 35 U.S.C. 103 as unpatentable over each of a publication by Shaplygin et al. in the Russian Journal of Inorganic Chemistry, volume 24, pages 820-824 (1979) ("the Shaplygin et al. publication"); a publication by Nguyen et al. in the Journal of Solid State Chemistry, volume 39, pages 120-127 (1981) ("the Nguyen et al. publication"); a publication by Michel et al. in the Materials Research Bulletin, volume 20, pages 667-671 (1985) ("the 1985 Michel et al. publication"); and a publication by Michel and Raveau in the Revue de Chimie Minerale, volume 21, pages 407-425 (1984) ("the 1984

Michel and Raveau publication"). See the final rejection dated 4-25-1991 in the 07/053,307 ancestral application.

In the 07/053,307 ancestral application, claims 1, 2, 5 through 11 inclusive, 40 through 44 inclusive, 46, 48, 51 through 54 inclusive, 60, 62, and 66 were finally rejected under 35 U.S.C. 102(b) or in the alternative under 35 U.S.C. 103 as unpatentable over a publication by Perron-Simon et al. in C. R. Acad. Sc. Paris, volume 283, pages 33 through 35 (12 July 1976) ("the Perron-Simon et al. publication"); a publication by Mossner and Kemmler-Scak in the Journal of the Less-Common Metals, volume 105, pages 165 through 168 (1985) ("the Mossner and Kemmler-Sack publication"), a publication by Chincholkar and Vyawahare in Thermal Analysis 6th, volume 2, pages 251 through 256 (1980) ("the Chincholkar and Vyawahare publication"); a publication by Ahmad and Sanyal in Spectroscopy Letters, volume 9, pages 39 through 55 (1976) ("the Ahmad and Sanyal publication"); a publication by Blasse and Corsmit in the Journal of Solid State Chemistry, volume 6, pages 513 through 518 (1973) ("the Blasse and Corsmit publication"); United States Patent No. 3,472,779 to Kurihara et al. ("the Kurihara et al. '779 patent"); a publication by Anderton and Sale in Powder Metallurgy No. 1, pages 14 through 21 (1979) ("the Anderton and Sale publication"). (See the final rejection dated 4-25-1991).

In the 07/053,307 ancestral application the Examiner asserted that the cited references appeared to disclose materials, which inherently provided superconductive properties and consequently therefore, rendered the claims unpatentable. Applicants rebutted the

Examiner's reasons for rejection based on limitations in the claims directed to Applicants' new discovery of the superconductive properties of these materials.

The claims of the present application are directed to apparatus for flowing a superconducting current in a superconductive composition of matter having a transition temperature greater than or equal to 26°K. This is Applicants' discovery for which they received the 1987 Nobel Prize in Physics. The Examiner in the 07/053,307 ancestral application stated by the 35 U.S.C. 102 and 103 rejections therein that persons of skill in the art knew how to make the compositions of matter based on the references cited therein. In that same final rejection the Examiner states at page 4 thereof "these materials appear to be identical to those presently claimed except that the superconductive properties are not disclosed." Applicants discovered the superconductive properties and in the present application are claiming apparatus using this property. Thus, by the Examiner's reasoning all of the present claims are fully enabled because the Examiner has stated that the compositions of matter recited in the claims can be made with the knowledge of a person of skill in the art prior to Applicant's filing date. Thus the Examiner, in the 07/053,307 ancestral application, agrees with the Applicants' Arguments and the Affidavits of Shaw, Duncombe, Tsuei, Dinger and Mitzi submitted by Applicants in support of their position that all their claims are enabled. In view thereof, Applicants respectfully request the Examiner to withdraw the rejection of the claims under 35 U.S.C. 112, first paragraph as not enabled.

Claims herein have been rejected as indefinite under 35 U.S.C. 112, second paragraph.

These claims have been rejected under 35 USC 112, second paragraph, as indefinite for using language of the type "rare earth like" and "pervskite-like", etc. As previously stated the Examiner has arbitrarily rejected Applicants' claims without providing a reason for why Applicants' terms are indefinite while similar terms are not indefinite in the claims of many issued patents. Applicants note that article incorporated by reference at page 6 of the specification were published in September 1986 (which lead to Applicants' Nobel Prize) and the present application was filed in May 1987 thereby clearly making this terminology part the high T_c superconductor art. As shown this is the vernacular of the field and well understood by persons of skill in the art. Applicants request withdrawal of the rejections of claims under 35 U.S.C. 112, second paragraph.

Applicants' invention is a pioneering invention. "The Supreme Court in *Westinghouse v. Boyden Power Brake Co.*, 170 U.S. 537, 562 (1898), characterized a pioneering invention as "a distinct step in the progress of the art, distinguished from a mere improvement or perfection of what had gone before." *Texas Instruments ICC 6 USPQ 2d 1886 (CAFC 1988)*. Applicants received the 1987 Nobel Prize in Physics for there discovery of superconductivity at T_c greater that or equal to 26°K which is about 8°K higher than the highest T_c previously known. Even though others following Applicants' teaching identified compositions having T_c more than 100°K greater than 26°K only Applicants have received a Nobel Prize for this subject matter. This is because the others followed Applicants' teaching to identify these other compositions.

Applicants respectfully request the Examiner to withdraw rejections of claims under 35 USC 112, first paragraph and second paragraph.

SUMMARY OF THE QUESTIONS RAISED BY THIS PROSECUTION

A number of Applicants' claims have been rejected under 35 USC 112, first paragraph, as not enabled by Applicants' specification. The Examiner has given these reasons in support of this rejection: 1) the Examiner's unsupported statements that the art of high T_c superconductivity is unpredictable; 2) the Examiner's unsupported statement that the theory of high T_c superconductivity is not well understood; and 3) the Examiner points to examples cited in Applicants' specification which do not show superconductivity greater than or equal to 26°K. The Examiner has provided no support for reasons 1 and 2 in response to Applicants' request that the Examiner provide evidence in support thereof or an Examiner's Affidavit in support thereof as required by 37 CFR 104(d)(2). The Examiner provided neither. Thus, reasons 1 and 2 are the Examiner's unsupported opinion. Applicants' examples that do not have a $T_c \geq 26^\circ\text{K}$ (Reason 3) do not support the Examiner's lack of enablement rejection in view of the decisions cited by Applicants, in particular, *In re Angstadt*, *Amgen v. Chugai Pharmaceutical Co.* and *In re Wands*. Applicants have provided extensive evidence in support of their view that their claims are enabled: 1) the five affidavits of Tzui, Dinger, Duncombe, Shaw and Mitzi, 2) the books and articles cited in these affidavits, 3) the book of Poole that states that the reason so much work was done in such a short period of time after Applicants' first discovery was that the high T_c materials were easy to make using well known fabrication techniques, 4) the article of Rao et al. entitled "Synthesis of Cuprate Superconductors" which cite numerous species of high T_c materials which can be made according to Applicants' teaching and 5) the CRC Handbook of Chemistry and Physics which cites numerous species of high T_c materials which can be made according to

Applicants' teaching. Many of the species in 4 and 5 are not specifically recited in Applicants' specification, but they come within the genus of Applicants' claims that have been rejected as not enabled. Moreover, there is no evidence of record that a person of skill in the art cannot, without undue experimentation, make these species following Applicants' teaching. The Examiner has not denied that Applicants extensive proof shows that a person of skill in the art can fabricate these species following Applicants' teaching. Under *In re Angstadt* and *In re Wards* it is Examiner's burden to establish that undue experimentation is needed to practice Applicants' claimed invention. The Examiner has made no attempt to satisfy this burden.

As stated all of Applicants' claims except for one was rejected in the final rejection of the parent application as anticipated or obvious over the Asahi Shinbum article under 35 USC 102 and 103. In the Examiner's Answer in the parent application, these rejections were found moot in view of the Examiner agreeing that Applicants effectively swore behind the date of this article. The Examiner has not withdrawn the 35 USC 102 and 103 rejections. Thus as alleged by Applicants from very early in the prosecution of this application, by these rejections, the Examiner has necessarily and unambiguously found all of Applicants' claims enabled. As stated, the Asahi Shinbum article [Attachment 6] derives its enablement from Applicants' publication [Attachment 3] which was published less than a year before Applicants' filing date and which is incorporated by reference in Applicants' specification. For a reference to anticipate a claimed invention the reference must enable from the teaching therein a person of skill in the art to practice the alleged anticipated claims and for a single reference to render obvious a

claimed invention the single reference must enable a person of skill in the art to practice the alleged obvious claims from the teaching of that reference in combination with what is know to a person of skill in the art. Thus, all of Applicants' claims that were rejected under 35 USC 102 and 103 over the Asahi Shinbum article must be fully enabled by the Examiner's own rational.

Applicants' claims have been rejected under 35 USC 112, second paragraph, as indefinite for using language of the type "rare earth like" and "pervskite-like", etc. As shown by Applicants, the claims of many issued US Patents use such terms. The Examiner has arbitrarily rejected Applicants' claims without providing a reason for why Applicants' terms are indefinite while similar terms are not indefinite in the claims of these many issued patents.

In view of the changes to the claims and the remarks herein, the Examiner is respectfully requested to reconsider the above-identified application. If the Examiner wishes to discuss the application further, or if additional information would be required, the undersigned will cooperate fully to assist in the prosecution of this application.

Please charge any fee necessary to enter this paper and any previous paper to deposit account 09-0468.

If the above-identified Examiner's Action is a final Action, and if the above-identified application will be abandoned without further action by Applicants, Applicants file a

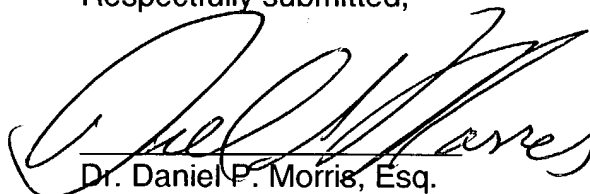
Notice of Appeal to the Board of Appeals and Interferences appealing the final rejection of the claims in the above-identified Examiner's Action. Please charge deposit account 09-0468 any fee necessary to enter such Notice of Appeal.

In the event that this amendment does not result in allowance of all such claims, the undersigned attorney respectfully requests a telephone interview at the Examiner's earliest convenience.

MPEP 713.01 states in part as follows:

Where the response to a first complete action includes a request for an interview or a telephone consultation to be initiated by the examiner, ... the examiner, as soon as he or she has considered the effect of the response, should grant such request if it appears that the interview or consultation would result in expediting the case to a final action.

Respectfully submitted,



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